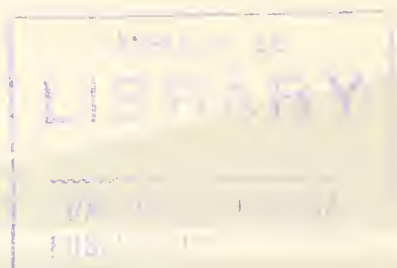




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# **CANADIAN** **MINING JOURNAL**

VOL. XXXVIII

TORONTO

No. 13

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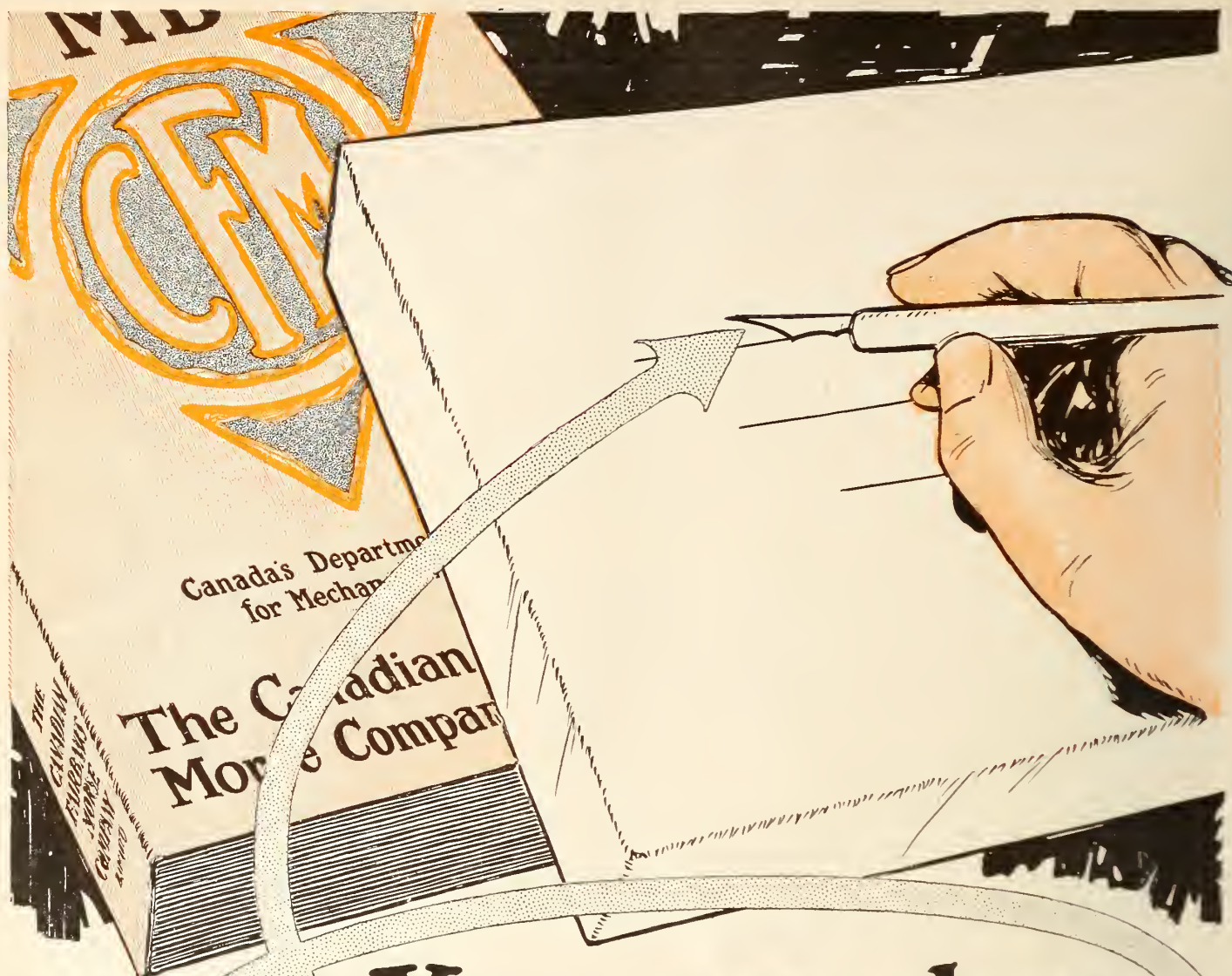
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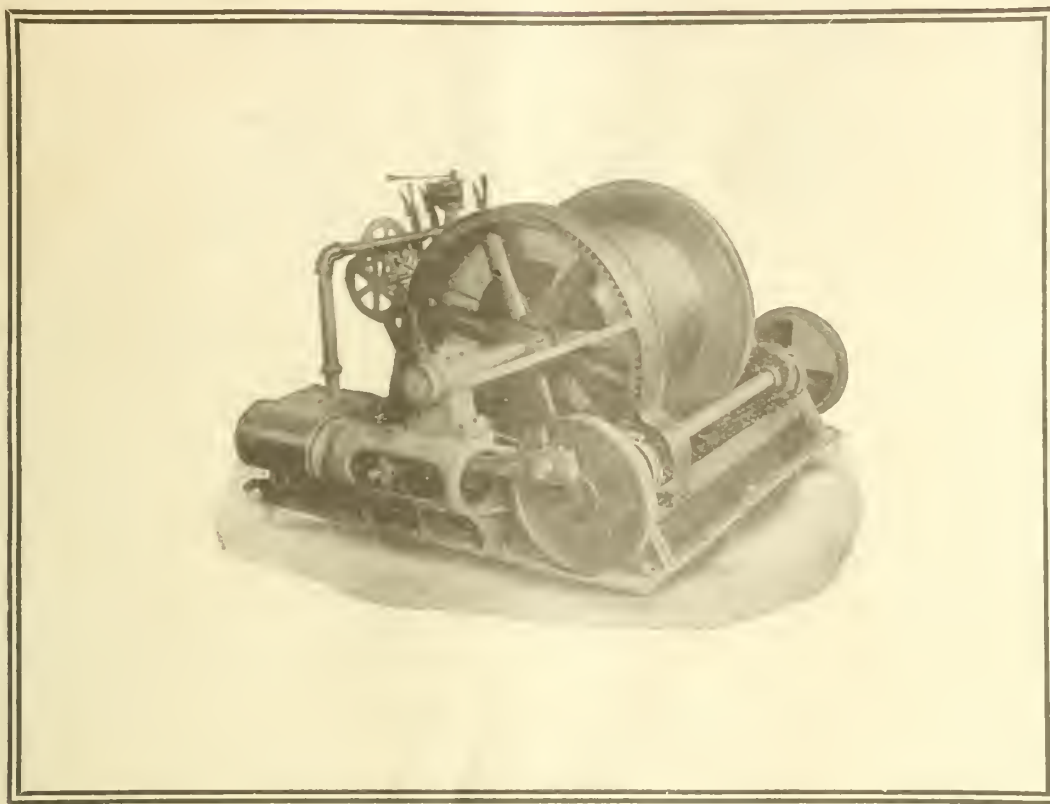
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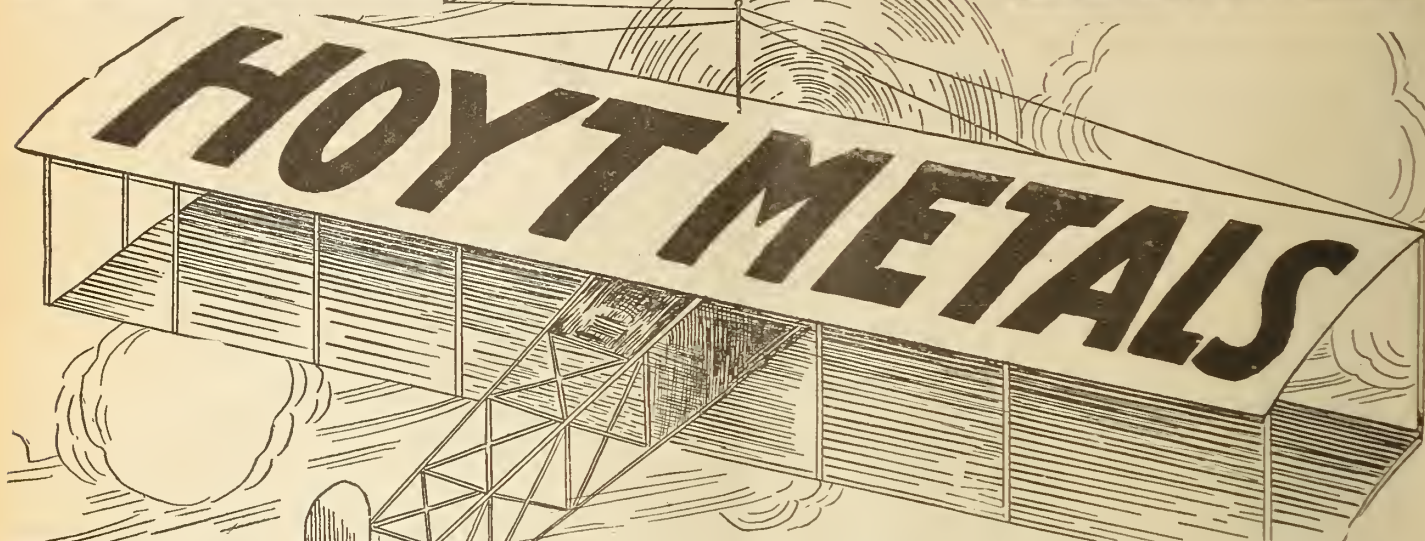
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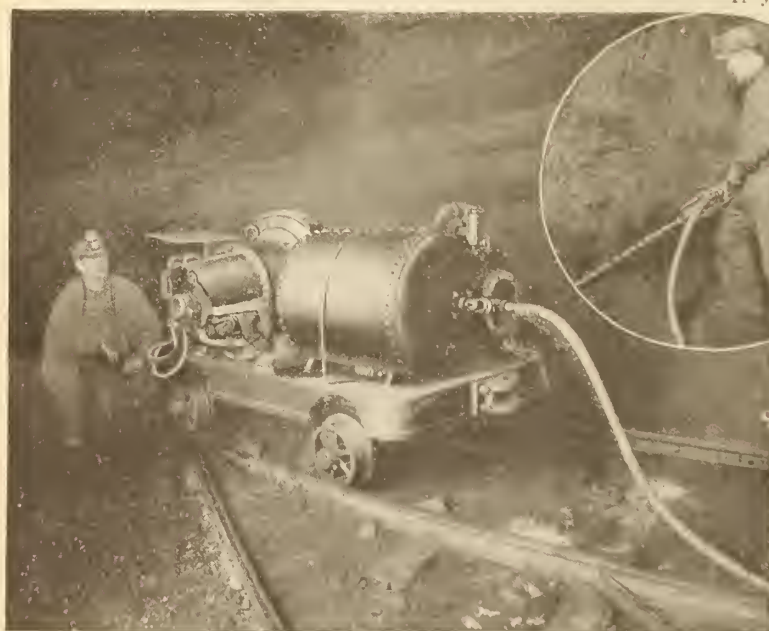
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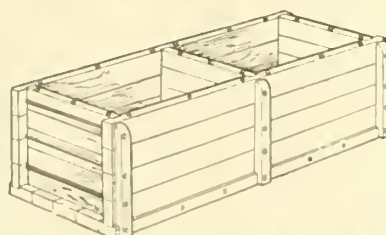
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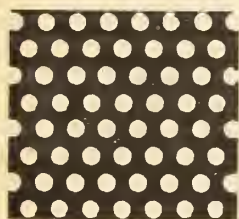
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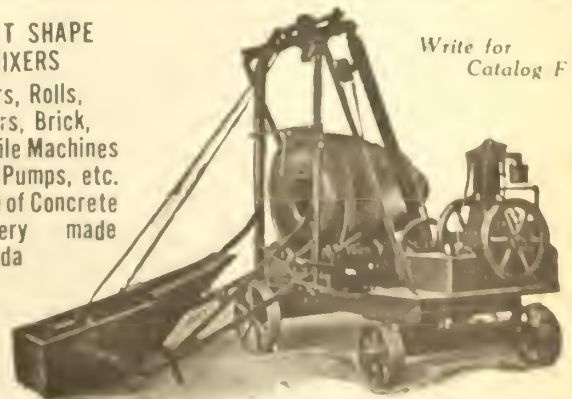
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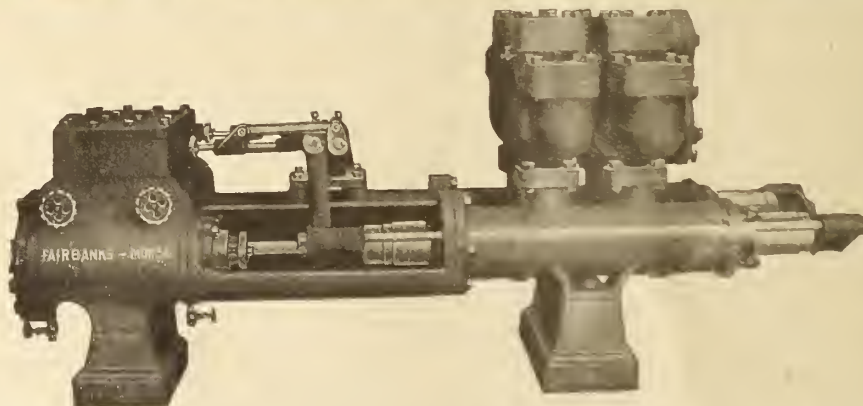
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# THE CANADIAN MINING JOURNAL

VOL. XXXVIII.

TORONTO, July 1st, 1917.

No. 13

## The Canadian Mining Journal

With which is incorporated the  
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada.

Published fortnightly by the

**MINES PUBLISHING CO., LIMITED**

Head Office . . . . . 263-5 Adelaide Street, West, Toronto

Branch Office . . . . . 600 Read Bldg., Montreal

Editor

REGINALD E. HORE

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### THE RECOVERY OF POTASH FROM FELDSPAR.

The Department of Trade and Commerce, Ottawa, in a recent bulletin republishes the extravagant claim of the secretary of the Canadian Potash Corporation, printed originally in the "Canadian Chemical Journal," and at various times in the daily newspapers. Unfortunately the Department of Trade and Commerce seems to be under the impression that the statement of the case is in accordance with the facts, for it reprints the article without drawing attention to its absurdities. We would suggest that the Department would do well to investigate before printing more such stuff. It is unfortunate that a Government Trade Bulletin should be made a medium for the spreading of misinformation.

### ESTIMATION OF ORE RESERVES.

As we have pointed out in these columns on previous occasions, the estimates of ore reserves presented to shareholders by some directors of mining companies are far from satisfactory. A regrettable case is that of the Dome Mines Company. It is no wonder that shareholders are confused by a comparison of the reports issued by the Dome directors. Those who have to depend on the official reports issued by the company must have a very hazy idea of the value of the Dome property.

### INCREASED WAGES FOR MINERS.

Reports from Porcupine indicate that at last the miners are taking their grievances to their employers and in consequence are getting some satisfaction. Increased cost of living should be met as far as possible by increased wages and the mine managers may be expected to meet reasonable demands in a reasonable way.

The situation at Cobalt becomes easier with the rise in the price of silver. The miners should receive some benefit from the rise.

### THE SMELTER SMOKE CASES

The decision in the Sudbury smelter smoke test cases will be welcomed by those interested in the welfare of the Sudbury district. As pointed out by Judge Middleton, the mining industry is the source of the prosperity of the Sudbury district. It would be absurd to interfere with the production of necessary metals because of slight damages to crops.

The readiness of the nickel producing companies to satisfy any reasonable claims for damages to crops is well known, and there will be little sympathy for those who took advantage of small losses to make demands for amounts far in excess of the damage done.



## CORRESPONDENCE

**The Ferrier-Adams Episode.**

Editor Canadian Mining Journal

Sir,—The Adams-Ferrier episode at the Ottawa meeting of the C. M. I. in 1916 was the most dramatic incident we have had at any of the meetings and it has always seemed to me unfortunate that an account of it was not published in the C. M. I. Bulletin and that Ferrier's statement should not have appeared until the issue of the annual volume, when the whole matter was to most minds as cold soup. There is much food for useful thought in the occurrence and in the details that led up to it.

You, Mr. Editor, have recently dealt with the wild-cattling methods accompanying the publication of the "discovery" of phosphate rock in B. C., and the only fault that we can find with your comments on this phase of the matter is that you did not perhaps bring it home sufficiently directly for the non-technical man to readily grasp the unpleasant facts. But with this, the wild-cattling-like publicity, neither Dr. Adams nor Dr. Ferrier had any direct part. Theirs is an altogether different episode, and it would not be without its usefulness to give some attention to their particular parts in the affair.

For some years past Dr. Ferrier has been chiefly concerned with commercial propositions; he has been acting as a professional man, in positions of trust, holding other men's affairs in his care and guard; he has been estimating risks, attempting to see things as they really are, more concerned with painful realities than with good stories, and so has gradually developed from the geologist to the Engineer. He used his geology to follow the phosphate rock over a wide area and located it in place ("mineral in place"—true discovery) in B. C. This is truly magnificent prospecting. I do not know of any better, and also real engineering: the utilization of the sciences to get results. He then systematically followed up his discovery—as an Engineer—with care and thoroughness, and then held his tongue—as an Engineer—until his clients gave him their long withheld permission to speak.

Now Ferrier's geological symptoms were developed at the impressionable period of his life and remain very firmly. No man enjoys telling a story more than does Ferrier. He still collects new incidents and continues to re-classify his older ones as assiduously as he does rare minerals or old editions, and the holding in of this story of the phosphate discovery for four succeeding long years must have been a continuous struggle and a continuous ache.

If (note the if) the phosphate had been there in commercially useful quantities, it would have been developed—by the engineer, an industry would have been established and there would have been tangible results; but in this case—for the engineer—there was not even a story. And this happens so frequently in engineering. The engineer's work may be of the highest order in effort, in skill, in patience and in loyalty and yet remain in obscurity.

How different are the conditions for the trained story-teller. Dr. Adams' whole expedition was a matter only of a few weeks, yet his "discovery" (not of "mineral in place") was heralded (by interested parties, not by the Doctor directly) over the whole world and like the story of the three black crows, grew in the telling. And the Doctor, presumably not a party to this wild telling, told later on his own story at the

meeting of the Canadian Mining Institute; told the story so exceedingly well that we all listened eagerly, as we should to good stories, and were so carried away by the story that I, for one, missed the point that the discovery was only of a bit of float.

For the accomplished story-teller a piece of float was sufficient for a very large result—in story telling—but for the engineer it was only one incident on the trail to results, it was only the beginning of further serious effort. This whole episode fits so many remarks in my paper\* of four years ago that I trust I will be pardoned if I repeat its closing sentence. The engineer "given his own way will hold his peace and be unrecognized and to the geologist and to the story-teller will be the glory."

Yours, etc.,

H. E. T. HAULTAIN.

**On the Origin of Sudbury Nickel Deposits.**

Editor Canadian Mining Journal:

Sir.—In your issue of June 1st is printed a letter, signed by "Geologist," criticizing a part of the Report of the Ontario Nickel Commission. The sarcasm in which "Geologist" indulges will hardly be regarded by your readers as fair criticism of the brief discussion on the origin of the orebodies of the Sudbury district, against which it is directed. Perhaps unintentionally, this apparent attempt to minimize the importance of this part of the Commission's excellent report, may cause a number of your readers, who might otherwise miss these valuable pages, to acquaint themselves with their contents. This part of the Commission's report serves a most useful purpose in briefly summarizing previous views and in bringing more nearly up to date the steadily increasing information, resulting from extended exploration and development of the mines, in the years that have elapsed since Dr. Coleman's report was written.

By seeking for an explanation of some of these later observations, which Dr. Knight has clearly set forth and which seem to some of us, who have been long in the district, not consistent with the theory of magmatic segregation, the author of the letter would have better served the cause of science, than by attempting to ridicule the hard, honest and keen-minded research of a fellow-worker in his own field. It is not desirable, nor is it in the interest of progress in scientific discovery, to consider any scientific theory or law as precluding criticism. The theory of natural selection, the law of conservation of energy and even the law of gravitation are open to further investigation and have been questioned. Science seeks only the truth. In this search there is no place for sarcasm. Humility is a foundation stone of true research.

In his second sentence, referring to Mr. Knight's discussion on the origin of Sudbury ore deposits, "Geologist" says: "He finds that all previous students of the geology of the region have been quite wrong in their interpretation of the ore deposits as formed by magmatic segregation, since they are really due to replacement by hot waters." Either this is an inadvertence, or it is a deliberate mis-statement, or "Geologist" is not conversant with the well-known work and views of a number of previous students of this subject. The last alternative is hardly tenable. Your readers may form different opinions as to which of the other two is correct.

\* "The Geologist"—a paper read at the Annual Meeting C.M.I., 1913, and published in the Transactions of that year



"Geologist" carefully evades important new observations made and published by Knight for the first time. He does not attempt to show how the intrusion of the granite foot-wall at Creighton mine at a later date than the norite hanging-wall, as evidenced by numerous off-set dykes of the former cutting the latter, comports with the theory of magmatic segregation. Nor does he attempt to explain the bearing on this theory, of the occurrence of the Levaek orebody well within the granite-gneiss underlying the norite and not on the norite-gneiss contact. Neither did Dr. Coleman, in his discussion on Knight's article in the Engineering and Mining Journal a few months ago, attempt a satisfactory explanation of the bearing of the former of these two phenomena on the application of the theory of magmatic segregation to Creighton orebody. And yet these two orebodies (Creighton and Levaek) have been regarded by supporters of this theory as typical.

Dr. Coleman, I believe, admits that Garson, Worthington and Victoria orebodies, with some others, probably originated from hot mineralizing solutions. General discussion is, therefore, of but little use. Progress can only be made by discussion of particular phenomena connected with individual deposits. The above statements regarding phenomena at Creighton and Levaek orebodies have not been controverted. How are these phenomena explained by those who believe that the large bodies of sulphides at these two mines were segregated by gravity from the norite while molten? Is it conceivable that the great, compact, continuous orebody at Creighton would not have been disturbed, faulted, broken up and intersected by granite dykes, had it been formed before the intrusion of the huge granite mass that forms its foot-wall? And why did not the settling sulphides at Levaek stop at the granite? How did they penetrate the granite-gneiss and form a large orebody from forty to over two hundred feet within the gneiss? To the mining engineer, whose scientific imagination has been trained qualitatively by his college course and reading in geology, and tempered quantitatively by dealing with the hard economic facts of lengths of drill-holes, drifts and "raises," how the magmatic segregation theory can meet these difficulties, is not apparent.

As a mining engineer, the writer is interested in any theory as to the origin of these deposits mainly because of the assistance it may render in the search for ore. When exploring the Levaek property, had our engineers ceased drilling after the drills had entered the granite-gneiss by a few feet, this large body of ore would not have been discovered. The illustration on page 165 of the Commission's report, showing the occurrence of this important orebody well within the granite-gneiss, makes clear the main reason why this great body of ore, indicated on surface by only a small outcrop, lay undiscovered for so many years, in spite of the fact that the property had been examined under option a number of times, including a previous examination by The Mond Nickel Company. Mining engineers will, therefore, welcome a clear explanation of the bearing of these two phenomena, at Creighton and Levaek Mines respectively, on the magmatic segregation theory. The ultimate purpose of the work of the economic geologist is the location of ore. The grandest test of an astronomer's theory is the location of a new star. The best test of a theory of origin of ore deposits in a given district will be the assistance it renders in finding a new orebody. Neither of the two theories advocated for this district would have assisted much

in the recent discovery of ore under the drift in Falconbridge Township. Observation as to where the ore generally occurs, with the aid of Dr. Coleman's excellent map, but without the aid of his theory, was the assistance rendered by the economic geologist in this instance. The discovery may fairly be credited to intelligent following up of an excellent map; but not of a theory.

But when a theory appears to have been a contributing cause in repeated failures to locate an important orebody, the mining engineer must feel justified in regarding it with suspicion, even though his doubt may not be regarded as having serious scientific weight by one who looks at the theory from a different standpoint. The engineer feels that he must discard the theory or ask its supporters for such an explanation as will appear rational.

The writer cordially joins "Geologist" in his final statement, if he will permit the substitution of the word "engineer" for "geologist" thus: "The mining engineer finds much of interest and much to ponder over in the report of the Royal Ontario Nickel Commission." But he would include the discussion on the origin of the Sudbury ore deposits as one of the most interesting, helpful and important parts of the report.

Yours, etc.,

C. V. CORLESS.

Coniston, Ont., June 23rd, 1917.

#### Origin of Sudbury Nickel Deposits.

Editor Canadian Mining Journal:

Sir,—In your issue of the 1st instant is a letter signed "Geologist," commenting on the report of the Royal Ontario Nickel Commission, against the tone of which I wish to protest.

There can be no objection whatever to criticism of this report, and that varying opinions are held by geologists as to the origin and relationships of the Sudbury orebodies is well known. Scientific discussion with the desire to arrive at facts, however, is one thing, and the willingness to strike from anonymous shelter is another.

Mr. C. W. Knight, who spent many months in studying the nickel orebodies underground, is well qualified to deal with the questions of structure and origin which arise in connection with these deposits, and is equally able to defend his views.

Mr. Knight has neither depreciated the work nor misrepresented the opinions of geologists who have preceded him in the field. In the Commission's report he has impartially set out the theories and conclusions of both predecessors and contemporaries, and I submit that any critic who may differ from him should do so over his own signature and in a similar spirit of fair play.

Yours, etc.,

THOS. W. GIBSON,

Secretary Ontario Nickel Commission

Toronto, June 18, 1917.

#### GOVERNMENT TO OPERATE COAL MINES.

It is expected that the coal mines of the Crowsnest district will soon be in operation under Government control. It is regrettable that pending a settlement of their dispute employers and employees could not come to an agreement and keep up production when coal is so greatly needed. The action taken by the Government seems a wise one, for it should result in early resumption of work at the mines.



## THE CONCENTRATION OF MOLYBDENITE ORES.

Notes by the Staff of the Department of Mining Engineering of the University of Toronto.\*

The concentration of molybdenite ores is a special phase of the general problem of the separation of one sulphide mineral from another and with this general problem the staff of the Department of Mining Engineering of the University of Toronto has been conducting research work for several years past.

Something over a year ago the results were so satisfactory that it was practically decided to undertake custom work in the milling laboratory to assist owners in the early prospecting or developing of their deposits. The laboratory has crushing capacity of 10 to 15 tons per day, but considerable alterations would have been required to allow of the economical hand-



Fig. 1. Concentrating Machine.

ling of this amount. Before actual work was commenced on these alterations it was learnt that Mr. Geo. C. Mackenzie in the laboratories of the Mines Branch at Ottawa backed by financial assistance from the Munitions Board was prepared to do this work on a larger scale. A visit to his laboratories showed that he was getting results, and we discontinued our work on molybdenite.

During the summer three or four commercial concerns produced molybdenite concentrates. As each one of these was built up around a special process there was little or no use suggesting another process to the men concerned. Lately, however, there have been considerable changes in the affairs of the chief producers, and many new properties are being developed or exploited and it may be timely to indicate the line of work carried on in our laboratories.

One of the producing companies is crushing the ore wet and using the Elmore vacuum process of flotation but no information is available as to their results. The other producers crush the ore dry and drop it on the surface of water where the molybdenite and considerable pyrites and mica and other silicates float. Then different devices are used to cause some of these undesirable minerals to sink. Complete details have not been made public.

In one case the Wood machine is used. In this the floating film of mixed minerals travels down over a steeply inclined wire screen, part of the water with much of the silicates and some of the pyrites pass

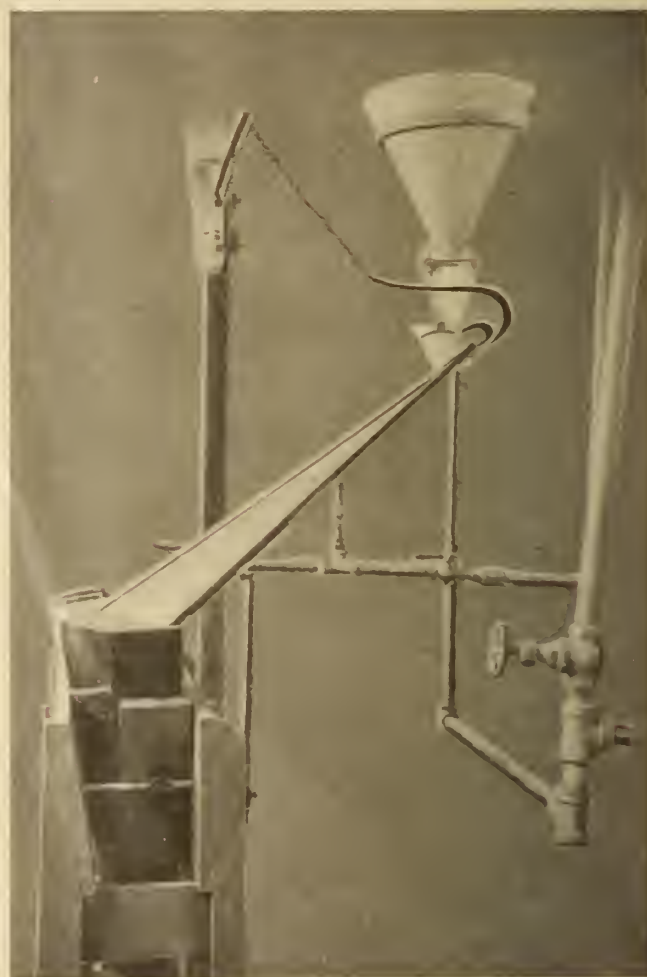


Fig. 2. Concentrating Machine

through the screens while the molybdenite and some of the other minerals travel over the screen.

Another mill uses Behrend's idea of passing the floating film of minerals over several small dams so that the film is alternately stretched and compacted; which results in a sort of competitive drowning in which the molybdenite has the best staying power.

In every case there is much re-treating, re-drying, sizing, or roasting to get a sufficiently clean concentrate.

We also float the molybdenite on the surface of water; but we approach this result in a totally different way. We crush the ore wet and then by spreading the pulp out sufficiently thin, the molybdenite breaks through to the surface and floats.

Figs. 1 and 2 show one of the laboratory machines. The machine consists mainly of a piece of sheet iron

\* H. E. T. Haultain, F. C. Dyer, J. T. King.



bent into a section of a cone. The lower edge dips into still water in a V-shaped tank. The pulp is fed from a small orifice onto the bent sheet iron and flows down and spreads out over it. The result is a gentle wave action.

Between the crests of the waves the pulp layer is very thin and the surface film very much stretched. The result is that the less wettable minerals break through, are picked up by the crest of the next wave and are carried down to the still water where they float. Here a gentle jet of air keeps them traveling towards the overflow and takes them out of the way of fresh comers.

The thickness of the pulp, the steepness of the plate, the surface tension of the water as affected by modifying agents, are all easily controllable means of affecting the cleanness of the float, and it is possible to make a very clean separation of different sulphides.

This method was developed to separate chalcopyrite from pyrrhotite and pentlandite and it works equally as well in separating molybdenite from pyrites, etc. Simple as both apparatus and process are in their present form many months were required to develop them. The human mind seems to travel from the complex to the simple when groping with new processes and we tried all kinds of schemes to aid or increase the action, only to find that the simplest was really the most effective as well as being the most easily controlled.

#### Concentrating Molybdenite in the Laboratory.

With molybdenite all sizes from 10-mesh to the finest slimes are effectively treated. In fact still coarser material can be handled; but it is not required in any ores that we have had. With the slimes it is not so easy to make clean concentrates and capacity and efficiency are sometimes both increased by aiding the wave action of the slimes by an intermittent feed. It appears advisable to split the pulp at about 60 mesh with a classifier, treating everything finer than this on one machine and everything coarser on another. One trip over the plate does not result in clean tailings; generally three or four are required. More than half the concentrates are caught on the first trip and smaller quantities in each succeeding trip. The proportion of pyrites caught with the molybdenite increases with each succeeding trip.

The concentrates from the third and fourth trip may have to be re-treated as in all other flotation processes, but the amount to be thus handled is very small. A test run on some Quyon ore illustrates this. It contained about 3 per cent.  $\text{MoS}_2$  and over 25 per cent. pyrites. It was crushed through 14 mesh and put over a hindered settling classifier which took out everything finer than about 65 mesh. The coarse product on the first two trips yielded 80 per cent. of the molybdenite in a concentrate assaying 84.2 per cent.  $\text{MoS}_2$ . The next two trips recovered the balance of the molybdenite in a product assaying 24.0 per cent.  $\text{MoS}_2$ . The assay laboratory failed to find molybdenum in the tails and microscopic examination confirmed this.

Where especially clean concentrates are required a very slight roasting of these middlings causes a film of oxide to form over the pyrites without affecting the molybdenite and on refloating this material a very clean separation results. On account of the sensitiveness of this wet flotation method no especial care

or accuracy is required in this roasting. In fact slow drying with occasional raking has been found sufficient to produce the infinitely thin film of oxide on the pyrites that is required to differentiate it from the molybdenite.

Generally the mica gives no trouble, a small quantity only remaining with the molybdenite; but this is not always the case. We had one ore in which there was more mica present than molybdenite, and it persisted on floating with it.

Some ores require no oil or other modifying agent; but in general the addition of a small amount is advisable. It is remarkable how small a quantity is necessary. One-tenth of a pound of oil to the ton of ore has a very marked effect. Experiments with this system have been conducted with satisfactory results on ores from the Wood mine, in Quyon, Quebec; from the Molly mine on Lost Creek, B.C.; from the Alice Arm mine, B.C., and others.

The laboratory machine is a full sized commercial unit and the commercial machine would simply be a multiplication of it. We have experimented with different sized plates and while these experiments are by no means final they point to a length of flow of about 30 inches as being generally suitable. In order to get capacity the plates should be superimposed with an inch or two between them and can be thus placed above a long V-shaped tank. Using flat plates and placing them radially above a cone tank and feeding them from rotating arms has some features to recommend it.

#### Advantages of the System.

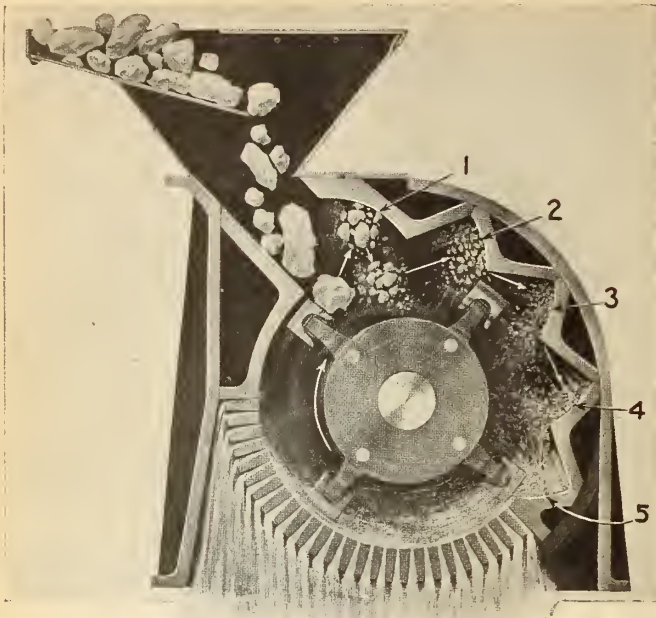
The chief advantages of this system lie in its extreme simplicity and the high grade of concentrates produced. In many cases no re-treatment of concentrates or middlings will be required. When this is necessary the amount to be so treated is very small and the operation simple and effective. The ore can and should be crushed wet, and fine screening is eliminated, so that the mill would be of the simplest type. In dry crushing molybdenite is smeared on other particles causing them to float by reason of this partial coating. In wet crushing this apparently does not occur.

#### THE PROBLEM OF THE SMALL MOLYBDENITE DEPOSIT.

The work done by Mr. Mackenzie at the ore-dressing laboratories of the Mines Branch at Ottawa has provided the first essential for the development of molybdenite mining in Canada. Owners or leasers of prospects have not only been able to have their ores tested, but have been able to have small or large lots treated at very reasonable rates. On fairly rich ore this leaves the shipper a margin of profit wherewith to continue his prospecting or development.

On account of the extreme irregularity of the deposits very few can show sufficient ore in sight to justify the erection of a mill for the complete treatment of their ore. To pay freight and treatment rates on medium and low grade ores does not help the situation. Dry flotation as in the Wood machine, if used to produce only very low grade concentrates, is an extremely simple process that can be safely used by anybody that could run a small steam engine. The



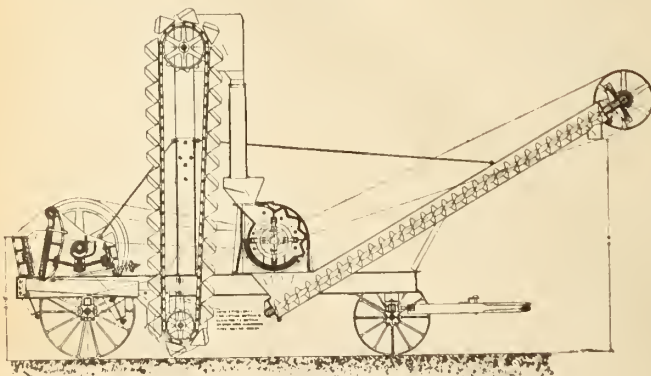


Ore Pulverizer.

only difficult essentials are that the ore be dry and crushed fairly fine.

In small tonnages ore can be dried on flat or curved boiler plate with a wood fire beneath. Recently manufacturers (Messrs. Allis-Chalmers) have put on the market modernized forms of an old pulverizer that should be the very thing for the fine crushing of the ore. The accompanying figures are taken from a catalogue. Figure 5 shows a complete crushing plant. We should prefer to have the discharge openings in the pulverizer itself larger and use a simple shaking screen to remove oversize and return it to the pulverizer.

A machine of this type, though not so well designed, has crushed a hundred thousand tons of the hard corundum and feldspar rock at Burgess, Ont., and this without any previous drying.



Complete Crushing Plant for Small Molybdenite Deposit.

Manufacturers could put out a simple, compact equipment of this kind, including a simple dry flotation machine, a pump to supply the water and the necessary boiler and engine that could be taken anywhere. The resulting concentrates would be low grade, probably from 15 to 30 per cent.; but they would stand freight and treatment charges to a central customs mill, while the ore itself would not.

## COAL FIELDS AND COAL INDUSTRY OF EASTERN CANADA.

The Department of Mines, Ottawa, has just published a report by F. W. Gray on "the Coal-Fields and Coal Industry of Eastern Canada." The occurrences in Nova Scotia, including the Cape Breton, Cumberland and Pictou fields, and New Brunswick are described, and a history of their development given. A very interesting section of the report is that descriptive of submarine mining, preparation of coal, methods of working etc. Explosions and mine fires in Nova Scotia are dealt with at some length. General conditions of employment are discussed.

The report has been prepared by a man exceptionally well qualified for the task. It is, as might be expected, a careful presentation of the facts. Fortunately it has been written simply and will be easily read and understood by anyone.

The report is well illustrated by reproductions from photographs and is indexed. The bibliography has been compiled with exceptional care.

### Economics of the Coal Mining Industry.

A study of economics of the coal mining industry leads Mr. Gray to observe:

"From the standpoint of the investor, the operation of coal mines in Nova Scotia in the past has not been encouraging. Some of the coal companies, during prosperous times, and in the earlier and less expensive operation of their collieries, paid regular and handsome dividends over many years.

"In very few instances, however, in the history of coal mining companies in Nova Scotia has there been any likelihood of a redemption of the original capital outlay, and a very moderate interest return is all the investor has been able to hope for. The majority of the companies now operating have been compelled to undergo financial reorganization. Several companies have suffered complete financial disaster, in some cases brought about by physical conditions beyond control, and in some cases by unskilful management, or the unjustifiable optimism of promoters.

"Generally speaking, however, the mines of Nova Scotia have been well managed from an engineering point of view, and the meagre financial return in the past has been due to alterations in the fiscal policies of Canada and the United States, resulting in temporary disorganization of markets, to the remoteness of the principal markets, the interference, or stoppage, of coast-wise shipments by ice in the winter, and the comparatively low selling price of coal in eastern Canada.

"Within the past twenty years the price of coal has varied very little, it being one of the few commodities that has not materially increased in selling value.

"It is doubtful whether the market for Nova Scotian coal has ever yielded the operators a greater price than \$2.50 per ton at the pit mouth, and the average price realized, after allowing for waste and slack coal, is very much less than this figure. A comparison with normal European pit mouth selling prices will show how moderate this figure is, if due consideration is accorded to the higher cost of labor and materials in Canada.

"The margin of profit has been too small to permit of the accumulation of proper reserves to provide against the troubles inseparable from mining coal, or to allow of adequate depreciation of reserves for the amortization of capital liabilities and the depletion of coal areas. Therefore, periods of financial depression or mining accidents, have too often forced the abandon-



ment of mining operations, and have involved investors in losses.

"The formation of the Dominion Coal Company was an evolution from these conditions, and whether it be a retrograde tendency or not, the logic of events has indicated the chief hope of settled prosperity in the Nova Scotian coal trade to lie in the further development of strong corporations, with adequate financial reserves. There is no reason to anticipate anything but a long and successful career for the coal companies of the Province if these essential qualifications are given the consideration they deserve.

"Whatever financial stability attaches to the coal companies of Nova Scotia to-day, is a testamentary benefit conferred by the General Mining Association; a monopoly that, with all its faults, rendered it possible to conceive mining operations on a comprehensive basis, eliminated suicidal competition in selling prices; and enabled mine workings to be laid out with the maximum of economy, with due regard to the conservation of the vast coal reserves which sporadic individual operations have tendered to endanger by misco-ordinated effort.

"The price of coal in eastern Canada has always been dependent on the selling prices in the United States, but it is candidly admitted, to-day, that coal has in the past been mined in the United States, and sold there and in Canada, at a price actually below the cost of production, when all the factors of that cost are taken into consideration.

#### Subsidiary Industries.

"Nova Scotia, as a province, has not reached the stage of industrial and manufacturing activity that should have accompanied a coal mining industry 100 years old; an industry that up to 1890 produced three-fourths of the coal mined in Canada, and, to-day, notwithstanding the vast coal resources of the west, is producing well over half the coal tonnage of Canada.

"A perusal of the pages of Dawson, Haliburton, and other great Nova Scotians, reveals a tremendous optimism concerning the commercial possibilities of Nova Scotia; and even to-day, it is not easy to find any flaw in the reasoning of these far-sighted men. Yet it must be confessed the potentialities of Nova Scotia have been but meagrely realized. Take away the steel industry from Nova Scotia, and what other manufacturing activity has the Province to show as a reflex of the production of 7,000,000 tons of coal annually?

"In the progressive communities of New Glasgow, Truro, and Amherst, there exists the nucleus of manufacturing, textile, wood-working, and leather trades, but how poorly they compare with the industries of Montreal and Toronto.

"The coal mined in Nova Scotia has, for generations, gone to provide the driving power for the industries of New England, Quebec, and Ontario, and has, in large part, been followed by the youth and energy of the Province. For almost a century, Nova Scotia has been exporting the raw material that lies at the base of all modern industry, and it is at least a legitimate subject for thought whether it would not have been possible to export manufactured articles, and to have utilized the raw material within the Province, to some extent at least, where safe and roomy harbors, and inexpensive water transportation give facilities for the assemblage of raw materials, and for the distribution of manufactured goods, in no way inferior to the other ports that border the North Atlantic coast.

"What combination of physical and political causes has brought about this condition of affairs cannot here be dealt with, but no consideration of the economic aspects of the coal industry of Nova Scotia would be just which did not point out the fact that the coal districts of Nova Scotia have not evinced the manufacturing enterprise that is a commonplace feature of coal-fields situated in civilized countries, as for example, Pennsylvania, the British Midlands, Westphalia, Silesia, and Belgium.

"Briefly, Nova Scotia has achieved the status of a mining camp, whereas its full stature should be that of a metropolis of industry."

#### CANADIAN ENGINEERS FOR RUSSIA.

London, June 22.—The American commission of engineers in London, a body of prominent engineers organized to render advisory and practical assistance to the United States Government and the entente allies during the war, has sent to Russia a committee of two military railway experts to offer advice and aid in re-organizing the railroads already built. The London committee also will give its assistance to the American railroad commission now in Russia.

The London committee's representatives are Lieut.-Col. J. W. Boyle, of the Canadian militia, and Lieut.-Col. J. A. MacDonnell, of the Canadian pioneer and railway battalions. They carry credentials to the British and American ambassadors and the Russian provisional government from members of the British Government and representatives of the United States and the Russian Governments in England.

Both Lieut.-Col. Boyle and MacDonnell have had wide experience since the war began in the construction of military railways in France, and prominent Russians in London express the belief that their advice and assistance will be of great value to the Russian Government. Lieut.-Col. Boyle probably is better known in America as a mining engineer, especially for his work in the Klondyke. He also is a transportation expert, and was instrumental in organizing the first Canadian pioneer battalion of railway troops. Canadian engineers, because of their efficiency, now are doing all the light railway work behind the British lines in France.

#### BILLION TONS COAL PROMISED.

Washington, June 15.—One billion tons of coal is the promised production for the nation next year under an agreement reached to-day between officials of the United Mine Workers of America and the Council of National Defense.

Equal recognition will be given by the Government henceforth to the mine workers and mine operators, and each will act as a check upon the other, it was decided at a conference held here to-day. At the close of the conference, John P. White, president of the United Mine Workers, said:

"With this new understanding reached I repeat my former statement that free workers organized as free men, can cover this country a foot deep with coal and in the next year raise its production from the former record of 600,000,000 tons to 1,000,000,000.



## COPPER AND GOLD IN MANITOBA.

By J. A. Campbell.\*

The name of Manitoba has so long been associated with No. 1 hard wheat that it would seem a contradiction in terms to connect it with any other line of production and especially so with something so fundamentally different from its well-known staple product as the production of minerals. But with the golden grain must now be associated the golden metal. New Manitoba appears destined to occupy a similar place in the production of minerals to that which the older part of the Province now holds in the raising of wheat.

Northern Manitoba unquestionably has mining resources that only await development to yield immense returns. The known mining area is in the region of a chain or series of lakes and rivers stretching easterly from Lake Athapapuskow, Schist and Flin Flon, near Manitoba's western boundary to Herb or Wekusko Lake, a distance of approximately 90 miles. The former is reached from The Pas, via the Saskatchewan River, through Cumberland and Sturgeon Lakes, and the latter is 11 miles from the Hudson Bay Railway, at about Mile 82. In the former district have been discovered immense deposits of copper sulphide ore, and in the latter veins of gold-bearing quartz, which have produced remarkable assays and are now beginning to yield good returns.

As is quite natural, the discoveries were first made and development work is now taking place at each end of the mineral area, those portions of the district which are the easiest reached by water and rail.

### The Great Sulphide Property—Flin Flon Lake.

This very important discovery was made in August, 1915, by Thomas Creighton, one of the prospectors for the Hammill-Currie-Fasken Syndicate, of Toronto. A large outcrop of oxidized ore was found on the south-east shore of Flin Flon Lake. Ten claims were staked and they now comprise the property. This was sampled, but owing to surface concentration the metallic content was extremely high, resampling, after shooting off the top of the orebody disclosed the fact that the ore would average about \$10 per ton in gold, copper and silver, the copper content averaging  $1\frac{1}{4}$  per cent. The orebody has been trenched for 1,700 feet at different points, and it is thought that it will be over 2,000 feet long. It is narrowest at the north end and widest at the south end, where it enters the lake. Here it is nearly 300 feet wide. The orebody is broken up in some parts of the vein, but it is mainly a solid mass.

The extent of this discovery was soon known. The owners succeeded in interesting certain prominent New York and Boston mining men, and as a result a contract was let for diamond drilling the property.

The work started with two drills on March 26, 1916, and continued until July 15, 1916, during which time 18 holes were put down, and over 6,000 feet of drilling done. While the returns of this work have never been officially announced it has been learned on good authority that this drilling with only shallow holes proved up over 3,000,000 tons of sulphide ore which at the normal price of copper would be worth \$10 per ton. Besides, the drilling did not extend over 1,200 feet on the ore body. One can therefore only imagine what a stupendous quantity of ore is likely to be revealed by further drilling. The work done on this property in 1916 cost upwards of \$50,000.

Owing to a disagreement regarding terms, no deal was closed out with the New York and Boston people.

However, recently, an agreement for sale of this property was entered into by the owners with a Toronto syndicate, headed by David Fasken, president of the Nipissing Mining Company, and John H. Black, formerly superintendent of the Timiskaming and Northern Ontario Railway, several millions being involved in the deal. This syndicate has lost no time, and already diamond drills are again at work. Between \$100,000 and \$150,000 will be spent on this property, in drilling and development work this year.

Should the results of this work during the year realize anything like the expectations of those engaged therein, such a body of ore will have been proven up as to warrant proceeding forthwith with actual mining operations on a very large scale. This will involve, among other things, the construction of a railway from The Pas, a distance of 90 or 100 miles, and the erection of a smelter at or near the property. To facilitate these mining operations it is probable that one or more of the water powers of northern Manitoba will be developed. Straight north of the property there are several rapids, on the Churchill River, from which, according to Dominion Government engineers, can be developed over 50,000 horse power. Besides, there are plans under way for the erection of an immense power plant, to use at least part of the 80,000 horse power available at Grand Rapids, on the Saskatchewan River, for pulp mills and other purposes. Should this enterprise take shape in the near future, undoubtedly some of this power will be conveyed to this and other mining districts for use in mining operations.

### The Mandy Mine—Schist Lake.

To the Tonopah Mining Company of Philadelphia and Nevada is accorded the unique distinction of being the first to ship out ore as a commercial commodity, and thus put Manitoba on the map as a mineral exporting Province. The mine from which this ore is taken is the Mandy mine, situated near the northern end of Schist Lake, and the ore is a marvellously rich copper sulphide.

Becoming interested in the north country and wishing a temporary change in occupation, Mr. F. C. Jackson, an engineer employed on Hudson Bay railway construction, decided to take a trip through some of northern Manitoba's lakes and rivers, with an off-chance of running across a mineral deposit of some kind. The result was a chance discovery, in October, 1915, of a mineral deposit, which, after allowing for the very exceptional expense of shipping the ore almost across a continent, will still pay magnificent returns. Mr. J. E. Spurr, one of the best known mining men in the United States, and vice-president of the Tonopah Mining Company, was then in the district, and on being shown a sample of the ore, he did not take long to close out a deal whereby his company took over the property on an agreement to properly develop and mine it, the original owner to receive a percentage of the profits. The Mandy Mining Company was forthwith formed, as a subsidiary, for the purpose of developing and operating the mine, and the work got under way as soon as possible.

From March to October, 1916, was occupied in surface trenching and diamond drilling, at an expense of \$40,000. Over 100,000 tons of ore were proved up, the larger part being copper and zinc mixture, but considerable percentage was shown to be clear copper sulphide, assaying over 20 per cent copper, with, in addition, gold and silver values of nearly \$5.00 per ton. This is all in one lens, but the formation is such

\* Commissioner of Northern Manitoba.



that there is strong ground for the expectation and belief that further mining work will open up another lens or more.

#### **A Unique and Successful Undertaking.**

The working of the Mandy mine has already resulted in the successful consummation of an enterprise which is probably unique in the annals of mining in Canada. This was the getting out and hauling a distance of 40 miles in the dead of winter, without any previous preparation, of approximately 4,000 tons of ore, all ready for shipment, to a smelter 1,200 miles away.

Early last winter, on the strength of a report and recommendation by Mr. H. C. Carlisle, superintendent of the company, with headquarters at The Pas, it was decided to mine and let a contract for the teaming of at least 3,000 tons of ore, to be hauled across lakes and portages to the head of navigation at Sturgeon Landing. This contract was let to Mr. C. B. Morgan, of The Pas, and in the closing days of 1916, the work was commenced. In the course of two weeks camps were erected, and the work of hauling the ore had started. Considering the weather and the obstacles to be overcome, this is exceedingly quick action, for in that period three complete sets of camps had been built, equipped, provisioned and occupied by a force of 110 men and 92 teams, required for hauling the ore. In addition to this 35 men were engaged by the Mandy Mining Company, and Mr. D. M. Haynes, of Denver, consulting engineer for the company, came up to help the work along. In getting out the ore the equipment consisted simply of a boiler, two steam drills, and a derrick, worked by horses. At the end of the season 3 600 tons had been got out. All of this is now in the dump at Sturgeon Landing with the exception of 450 tons which have been hauled right through to The Pas, a distance of about 90 miles, and three carloads of this has already been shipped to British Columbia.

When navigation opens the ore now in the dump will be brought down by boat and barge and then trans-shipped by rail to a smelter. All this ore was got out by surface mining, and the open cut is now down a depth of about 25 feet.

#### **The Government Road.**

Anticipating to some extent the development of the district the provincial government, through the commissioner of Northern Manitoba, early in the Fall of 1916, let a contract for cutting out and clearing a roadway across the portage between Sturgeon Lake and Lake Athapapuskow, a distance of about 17 miles, and while the road has not been completed sufficient work was done thereon in the Fall to allow its being used as a Winter road. Thus, owing to this road being available for hauling ore the mine owners and contractors were able to carry out the above-mentioned enterprise. Had it not been for the work done by the government in this respect these mining operations would have had to stand over until a later period. The advantage of such a road is therefore apparent, and it is the intention to complete the work and put the road in reasonably good shape for Summer hauling as soon as possible.

In addition to the teams engaged in the work of hauling ore a considerable number were employed in hauling in supplies and taking out fish from Lake Athapapuskow. At least 120 teams were therefore continuously using this road during the Winter months.

#### **Mining Operations During the Summer.**

During the Winter the Mandy company have got in considerable machinery and a full line of supplies for the Summer work for they purpose going ahead with

the mining operations and the transportation of the ore to as great an extent as is possible during the Summer months. Last Winter a 52-foot rig was purchased and transported overland to Lake Athapapuskow. This was a notable piece of freighting—14 tons a distance of 65 miles. A stern wheeler and four barges are now being built at Schist Lake for work on that body of water. The Ross Navigation Company also have another stern wheeler under construction at The Pas in addition to several barges.

There were taken into the mine last Winter a hoisting engine, 150 horse power boiler and compressor with all necessary equipment for underground mining, also full equipment for a sawmill which has been set up and is now running. A gas tractor of the caterpillar type capable of hauling 20 tons is now on the ground and will be tried out over the portages.

All this work, supplies and equipment involved a big expenditure and when the machinery above mentioned has been set up and the bills paid to date the Mandy Mining Company will have expended close to a quarter of a million dollars.

#### **Herb or Wekusko Lake Gold Mining District.**

At the other end of the series or chains of lakes and rivers is Herb or Wekusko Lake where somewhat different conditions are found. The showings here are all in the nature of gold quartz, with slight traces of platinum and other metals. Within the last few months a camp has sprung up here and several groups of claims are now being actively developed. Mr. J. Burr Tyrrell, C. E., well known in connection with northern exploration some time ago outlined the geology of this lake district and reported favorably on the formations as a probable field for auriferous quartz. His report was read by Mr. M. J. Hackett, an experienced prospector and miner, who was sufficiently influenced thereby to make a prospecting trip into the district in question and in the Summer of 1914, accompanied by Mr. R. Woosey, spent some time at the lake and during the season discovered quartz bearing free gold in what is known at the present time as No. 1 vein of the Kiski claim. Before returning from the field Hackett and Woosey stripped and trenched this lode sufficiently to satisfy themselves that their discovery was valuable. They returned to the Pas and exhibited free gold specimens which resulted in other prospectors going into the field and staking claims.

Since that time considerable prospecting has been done, but it has been confined for the most part to a strip of territory 5 miles long by 2 miles wide, beginning at the Kiski claim at the south and ending with what is known as the McCafferty claims on the north. Various veins have been discovered within this area and several groups of claims have been disposed of to outside capitalists. During last Fall and Winter a great deal was done in the way of developing some of the most promising of the claims, culminating in the introduction of mining machinery and the shipment of a car of ore to Trail smelter. The following is a brief resume of existing conditions as to some of the well known claims:

#### **Kiski Wekusko Claims.**

The original discoverers disposed of their interest in these claims and they are now in the hands of a Toronto syndicate headed by B. McLaren, a well known capitalist. Since the change in ownership a few months ago, development work is proceeding apace. A contract was immediately let for sinking a shaft which is now down to a depth of 30 feet. The average width of the vein is about 3 feet 6 inches. The



gangue is well mineralized with arseno-pyrite, chalcoppyrite, and free gold is often visible to the naked eye. Mr. McLaren has a full equipment of machinery for this property, but shipment will be delayed until the wagon road from the Hudson Bay Railway to Herb Lake has been completed. In the meantime prospecting will be carried on by means of stripping, trenching and a thorough sampling of the property.

#### **The Rex Group.**

This is probably the best known group at the lake. It consists of seven mineral claims adjoining one another. Most of these were located by Messrs. Campbell, Hassett and Moore, well-known prospectors. Claims owned by others were added to the group which was sold last Fall to McKeever Bros., New York. Their engineer, Walter Neal, spent considerable time starting operations on the property, and before he left, about the end of the year, camps had been erected, a steam plant consisting of drills, hoists, pump, etc., had been installed, and the men employed placed in charge of a capable overseer. A recent report is to the effect that shaft No. 1 is now to a depth of 80 feet, that the values at this depth are high, and that the vein is increasing in width. Work has been commenced on No. 2 shaft.

As a result of reports received, Mr. Neal has just written as follows: "There is not a shadow of a doubt but that we have a mine there and I believe there are a good many others similar in the same district. I am perfectly ready to send in an order for machinery for the mill right now on the showing we have, but I shall not do so till after my next visit there, which will be within about a month, as I have to consider the lay of the land in designing the mill."

#### **Moose Horn—The Northern Manitoba Mining and Development Company.**

The big feature of this company's operations was the shipping recently of a carload of 57,000 lbs. of gold-bearing quartz to a smelter at Trail, B. C. The returns from the car have just been received and were \$2,323.60 in gold, an average of \$81.53 per ton—some shipment! This was no hand-picked sample, but was taken from shaft No. 1 of the Moose Horn in the regular way. The above company is purely a local concern, the organizers being well-known engineers and mining men. It is the only company that has as yet put shares on the market. A few months ago a block of stock was sold to residents of The Pas and district at 25 cents per share in order to realize additional money required for development purposes. No stock is now on sale.

The work already done on this property consists of a shaft sunk to a 50-foot level. There is installed at the mine a 50-horsepower boiler, 5-drill air compressor, drills, hoists, pumps and other equipment, and Manager Longley expects to have the plant in shape for aggressive mining in a few days' time and will then continue sinking the shaft. At the 100-foot level drifts will be started both north and south. Channel samples at the bottom of the shaft have given assay returns of \$170 per ton, and the vein has widened from 15 inches to two feet.

#### **The Elizabeth-Dauphin Group.**

After disposing of their holdings in the Kiski and Rex properties, respectively, M. J. Hackett and J. R. Campbell, already mentioned, consolidated their interests in certain other claims with those of J. M. Wanless, resulting in the above group of four claims being formed. These were sold a month or so ago at

a nice figure, and a company. The Pas Consolidated Mines, is now being organized to develop and operate them. The property shows an exceedingly well-defined vein.

#### **Other Claims and Discoveries.**

In addition to what has already been mentioned, work of importance has been done on various individual claims. The McCafferty lode, to the extreme north of the staked area has produced some very rich surface specimens and the vein has been stripped for over 1,200 feet. There have been some good showings also from the Nemo, Trapper, Centre Star, Bingo, Le Roi and Ballard.

The fissure in this mineralized zone cuts several formations, namely, chlorite schists, gabbro, quartz-porphyrines and altered gneiss. The values do not seem to be confined to any particular formation.

#### **Road From Railway to Lake.**

The great need of this camp is a wagon road to connect with the Hudson Bay Railway. Early this year Mr. J. P. Gordon, C.E., formerly assistant chief engineer of the Hudson Bay Railway, who is thoroughly acquainted with the country made a reconnaissance and survey and marked out a road from Mile 82 to the lake which line is about 11 miles in length and can be built at a minimum of expense. In this stretch there is a little over one mile of corduroying required, and as it was important that this work should be done before Spring break-up a contract therefor was let a short time ago and the work is now progressing. The provincial government have since called for tenders for the completion of the whole road and it is expected the contract will be let and the work commenced in a very short time. The construction of this road will enable those interested to take in machinery, supplies and equipment throughout the Summer and thus the work of mining development can continue without interruption. This condition of affairs is very much appreciated by the many who are now engaged in active operations and others who contemplate starting work at an early date.

This whole mining district north of The Pas is and has been for some considerable time attracting very general attention among mining men both in United States and Canada. Many of the best known and capable men in connection with the mining business have personally investigated or sent their representatives into this territory.

Further discoveries have been made and claims staked in other parts of the above mentioned areas, between Athapapuskow and Herb Lake, but no development work has yet been done thereon. Also in different parts of the northern territory outside this area, "finds" have been made from time to time at Island Lake, Piquitona, Kettle Rapids, Cross Lake and other places. Just what these amount to remains to be seen. But anyone who is at all familiar with the rock formation of this territory and who knows about discoveries which have already been made feels quite confident that this great country contains vast wealth in its mineral resources which are only waiting to be developed. The need of the country, however, is prospectors. Compared with other mineral districts which have been exploited the discoveries already made have been marvellous when it is considered how few people have been engaged in real prospecting work.

Were it not for the great war with its direct effect on the supply of men and money there would undoubtedly long ere this have been a big rush into the mining and mineral region of Northern Manitoba.



**RESOLUTIONS PASSED AT NELSON, B. C.**

Among a number of resolutions passed at the International Mining Convention held at Nelson, British Columbia, on May 18-19, which was one of the most important and largely attended gatherings of mining men ever held in Kootenay district, were the following:

(1) "That the serious condition created by the coal miners' strike in Western Canada is having a most disastrous effect upon all industries, which will shortly be paralyzed.

"Resolved that the Dominion Government be asked to take immediate temporary possession of all coal mines, now idle, or which may be idle, and operate them to their full capacity to produce coal and coke; that a commission be appointed at once with full power to take evidence on oath, and that full investigation shall be made as to who is in the wrong in the dispute between capital and labor, and whoever it may be, that the wrongdoers shall be compelled to do their duty, if necessary, under the application of military law. This convention takes no attitude on the question between capital and labor, but it believes that the prosperity of the whole Dominion, and possibly the success of the Allies in the prosecution of the war transcends in importance a dispute that should be settled by a power greater than either labor or capital."

(2) "Whereas, the Provincial Government has brought in a bill containing radical changes in the mining laws, resolved that this convention believes that any changes at this time would tend to discourage investment of capital, and that, before making any changes at any time the responsible officials of the Government should consult fully with miners' and mine owners' associations of British Columbia to the end that the knowledge thus gained by practical experience be incorporated in such amendments.

(3) "Whereas, following an address made here by Mr. Thomas French concerning the French electrolytic process, this convention is convinced that in such a process the country possesses a potential factor for economical recovery of vast reserves of zinc in complex ores. Resolved, that this convention recommends that the Dominion Government thoroughly investigate this process through the best technical knowledge available, and that if it be found practical, it be aided and protected by Government subsidy, to the end that these great resources of the Dominion be developed forthwith."

(4) "Whereas there are some 1,100 Crown granted mineral claims in the Province not being operated or improved upon.

"Resolved, that the Provincial Government be requested to devise a scheme of taxation that will enforce the development of Crown-granted mineral claims within a reasonable time."

(Note—It is probable that the number of unworked Crown-granted mineral claims in the Province would be found, on investigation, to be very much larger than is stated in the foregoing resolution—E. J.)

(5) "Resolved, that the Government be asked to amend Chapter 162, R. S. B. C., so as to allow any tributary mining claim to have ore or any other material transported through any tunnel, adit, shaft or other mining development, and over any tramway used for mining purposes, now constructed, or hereafter to be constructed, upon equitable terms and conditions as now provided for in this chapter at any and all times, when the owners of such tramway, tunnel, adit, shaft or other mining development are not using such for their own purposes to full capacity of same."

**RECENT LEGISLATION CRITICIZED.**

Speaking at a meeting held at Nelson on May 12, Dr. W. O. Rose, member for Nelson electoral district in the Provincial Legislative Assembly, a member in opposition to the present Government, said concerning the bill referred to in No. 2 resolution, printed above:

"If this measure had been passed as it was introduced it would have been disastrous to the mining industry and in the form in which the Government finally forced it through the House it is not going to be of much benefit to the industry nor the prospectors that it purports to assist.

"In the form in which the bill was placed before the House by the Government it contained some very objectionable features. One of the most dangerous—and it still remains in the bill—is that which permits one of the district engineers to walk on the property of a prospector without his permission, have diamond drilling carried out and charge the expense against the claim. And the expense charged is to be double the actual cost of the work, plus 6 per cent. interest per annum."

Dr. Rose pointed out that under such terms as this in many locations a mere matter of 1,000 feet of diamond drilling would pile up against a prospector's property a charge of possibly \$8,000, which would be a first charge. And this could be done, under the Act, without the consent of the claim owner. He believed that such legislation was unjust and that it would tend to frighten investors as well as working a hardship on any claim owner who happened to have his claims drilled under such conditions. To carry out diamond drilling without the claim owner's consent was an interference with the rights of the individual which could not be supported by any sound argument. Yet the Act had been passed with this provision in it.

Then the bill as introduced had contained a "blue sky" provision for the protection of investors, which would have placed a tremendous power in the hands of an unscrupulous or incompetent government engineer to block any deal he cared to interfere with. It would have given engineers power to give a black eye not only to individual properties but to whole mining districts. The Opposition had succeeded in having some changes made in this provision, which it was hoped would make it less dangerous than it was in the form in which the Government had proposed to put it through.

Another point the Opposition had taken up in connection with the mining bill had been the districts allocated to the Government engineers. In many cases they were far too large. East and West Kootenay, for example, the richest and most productive mining section of the province, had been formed into one district with the engineer's headquarters at Revelstoke, the far north-western corner of the district. Dr. Rose recalled that he had endeavored to have the headquarters changed to Nelson, the most central point, instead of Revelstoke, a district which did not contain one producing mine. The Minister had said that the engineers should be given latitude in selecting their own headquarters, but the bill had gone through with Revelstoke as the headquarters for the whole of East and West Kootenay.

Touching briefly on the Government's bill to give the Minister of Mines power to build smelters, concentrators, sampling plants and all sorts of other plants, Dr. Rose pointed out that the Act did not provide one cent to do all this with.



## CORRESPONDENCE

## The B. C. Mineral Survey Bill.

Editor Canadian Mining Journal:

Replying to your letter of the 15th ult., concerning the provisions of Bill No. 11 (B. C. Legislature) Mineral Survey and Development Act, I am not sure how far provisions of this bill overlap presently existing arrangements. No doubt, it is an attempt to develop the latter and, theoretically, any overlapping would be adjusted.

Part 1, Section 6.—The qualifications mentioned are not sufficient; several years (at least five) in the field and on the administration of mining companies should be required.

Part 2, Section 11 (b).—Judgment is vital for carrying on the work referred to. By exercising the most excellent judgment results may still prove unsatisfactory. It is not just that a man should be forcibly placed under the necessity of incurring a liability, even to the loss of his property, through the failure of judgment of another party, viz., the Resident Engineer.

Part 3, Section 14 (1) and (2).—Assuming that semi-monthly payments are not generally enforced, it should be left to the option of the employers, considering that security is given, to pay monthly or semi-monthly. It is often most inconvenient and costly to pay semi-monthly.

Yours, etc.,

ERNEST LEVY.

Rosslund, B. C., June 13, 1917.

## ELECTRIC DRILL WITH SPECIAL CONTROL.

A special control which is designed to prevent the breakage of small drills when operating the close-corner electric drill is shown in the accompanying illustration. The operating scheme is similar to that of an automatic pistol, one finger doing the work. The grip need not be released to turn the switch or push in or pull out the handle at the moment the drill breaks through. The housings are cast from an aluminum alloy having a high tensile strength and resistance to distortion. The chuck is strong and rigid in design. The motor is of special design, and made by the Robbins & Myers Company of Springfield, Ohio.

The commutator and brushes are readily accessible by removing four screws, which enables the top cover to be slipped off. This cover does not carry the armature shaft bearing. This bearing and brushes are carried by an inner spider, which is protected from external injury or strains, tending to bind the bearing. Furthermore, this construction allows the drill to be run while the cover is removed for inspection of the



Drilling Machine that Protects Small Drills.

brushes and commutator, which is a great practical advantage to the upkeep of the tool. The Northern Electric Company, Limited, is the exclusive Canadian distributor of this outfit.

## OBITUARY.

## D. D. Cairnes.

The announcement of the death on June 14th, after a short illness, of DeLorme D. Cairnes of the Geological Survey, will come as a shock to many friends and acquaintances both in Ottawa and amongst the mining fraternity of Canada. Mr. Cairnes graduated in 1905 from Queen's University with the degrees of Bachelor of Science and Mining Engineer. Subsequently, he took post graduate work at the Royal School of Mines, Freiberg, Saxony, and at Yale University, from which he received the degree of Doctor of Philosophy in 1910. He was a life member of Freiberg Geologische Gesellschaft, a Fellow of the Geological Society of America, a member of the American Association of Science, a member of the Canadian Mining Institute, and also of various local associations. Mr. Cairnes was in his 38th year and was predeceased by his wife (nee Miss Florence Fenwick, of Kingston) who died in 1914.

Prior to 1905, when he joined the staff of the Geological Survey, Mr. Cairnes had already been engaged in mining and geological work in Canada and the United States. While a member of the Survey, with which he was still connected at the time of his death, his field of work lay in Western Canada, chiefly in Northern British Columbia and the Yukon Territory. He visited and reported on most of the mining centres of this important region and was ever active in endeavoring to aid and promote the mining industry. Besides numerous reports and maps published by the Geological Survey, Mr. Cairnes also contributed many important papers to the technical and scientific societies of which he was a member. His death at so early a stage of such a promising career is a great loss to the mining and scientific world and to the Geological Survey.

## THE MINERALS SEPARATION SUIT.

The announcement of the decision of the Court of Appeals in Philadelphia in the case of Minerals Separation against Miami Copper is of considerable interest to users of the flotation process. As stated in the Canadian Mining Journal of June 1, the majority opinion was in favor of the plaintiff.

There seems to be a disposition on the part of some of our readers to accept this decision as one against the rights of users of the Callow cell. The decision in the suit against Miami Copper does not, however, mean that the Callow machine is an infringement. On this point Judge Wooley said:

"If the only agitation to which the pulp was subjected (after such agitation as in the prior art was necessary to mix the oil and ore) was the agitation of the Callow cells, we would not say that that agitation amounted to or was the equivalent of the violent agitation of the patent disclosure, and constituted infringement; but in the process we are considering, and upon which the decree we are reviewing was based, the Callow cells were not the whole process, but were merely the last of four distinct parts of the process, the other three being the process of the patent or its fair equivalent. Having used the process of the patent in the first three steps in developing the potentiality of the critical quantity of oil and air, and bringing the pulp to a point where, if permitted, it would produce the result of the patent, we feel that the defendant cannot escape infringement by taking an additional step, even though that step, if taken alone, voids the patent."



## SPECIAL CORRESPONDENCE

### NORTHERN ONTARIO.

#### Hollinger.

The recent decision of the president of the Hollinger Consolidated to discontinue for the time being the payment of dividends on the outstanding capital stock of the company came somewhat as a surprise to many mining men and investors throughout the north country. It had been generally supposed that the reduced rate could be easily met and a tidy surplus built up.

It is the consensus of opinion now, however, that the policy is to build up a surplus as rapidly as possible so that in the event of still further labor shortage to the extent perhaps of forcing curtailment of production, development work could be gone ahead with and financed by the cash surplus on hand. The ore reserves of the mine are now understood to be upwards of \$35,000,000, and in a general way the physical conditions of the mine are better than ever before in its history.

#### Dome.

It is generally feared that the Dome Mines Company will at an early date follow the lead set by Hollinger in the matter of discontinuing the regular rate of dividend disbursement. The mill is running far below capacity and the grade of ore is not up to average. This latter fact is due to the inability of the present reduced forces to mine and raise ore from the lower levels of the mine where the grade of ore is comparatively high and which would ordinarily be used to sweeten the lower grade coming from the "glory hole." However, no official announcement with regard to dividends has been made.

#### Relief from Assessment Work.

The recent order-in-Council exempting for one year owners of mining claims from the compulsory performance of assessment work on all claims recorded prior to May 26, of the current year and on which work falls due prior to April 16th, 1918, has met with favor in this district. The measure is expected to result in more than the usual number of prospectors remaining at work at the producing mines instead of hitting the trail as is the usual custom at this season of the year.

Owing to the successful results being met with on the Anchorite property in Deloro Township, the Welsh claims are now being opened up. A small force of men are at work and arrangements are being made for the carrying on of diamond drilling operations to prove the property at depth.

#### Hollinger Reserve.

The shaft on the Hollinger Reserve property is nearing the 500-ft. level, to which depth it will be continued without delay. It is the intention of the company to do considerable exploration and drifting at this level. If the grade of ore warrants it, a small ball mill will be installed next fall. A considerable tonnage of fair grade milling ore has been placed on the dump from the 2,000 feet of underground work already accomplished. At the present time the vein is the full width of the shaft and free gold is of comparatively common occurrence in the working.

#### Coniagas.

It is now considered probable the Coniagas Mining Company will exercise their option on the Anchorite property at Porcupine. Two large veins have been opened up to a considerable extent. These veins are close together and it was also found that the rock intervening would prove of commercial value and could be profitably treated. It has been decided to move

the mining plant of the Agaunio Mines Development Company to the Anchorite. The plant consists of a six-drill compressor, pumps, hoists and other machinery.

#### Hayden.

The main shaft of the Hayden property is nearing the 400-ft. level. At the 300-ft. level a considerable amount of crosscutting was done with fair results. It is intended to do considerable lateral work when the 400-ft. level is reached. The property is equipped with a plant of sufficient capacity to carry development work to the 600-ft. level. Arrangements are being made to diamond drill the property. A new cage has recently been installed and is working smoothly.

#### Scottish Ontario.

A Montreal syndicate is understood to have purchased a controlling interest in the Scottish Ontario, which is situated in Whitney Township, about one mile north of Porcupine Lake and was one of the pioneer properties of the Porcupine camp. It adjoins the Bannerman on which some of the first gold in the district was discovered.

#### Wright-Hargraves.

At the 100-ft. level in the two shafts of the Wright-Hargraves property at Kirkland Lake, stations have been cut and the vein proven to be twelve feet wide at No. 3 shaft and twenty feet wide at No. 2 shaft. It is stated that values of \$30 per ton were found across the width of the orebody. No. 2 shaft, prior to machinery troubles, had been driven a depth of 150 ft. and the No. 3 shaft has reached a depth of 108 ft. The main vein has been opened up for a distance of 3,000 ft., along the zone in which is found the ore which is making the Kirkland Lake camp famous.

#### Schumacher.

Ore reserves at the Schumacher mines have increased nearly \$300,000 since the previous report was issued nine months ago. Nine months ago the ore reserves were estimated at \$396,700, whereas the latest report shows \$671,240. The operating statement showed that gross production amounted to \$169,186, as against \$153,777 in the last report. Development costs absorbed the greater portion of this amount, leaving \$15,747 net profit. \$10,000 was allowed for depreciation and other adjustments, and \$3,079 was carried forward to the surplus, against \$31,932 in the previous report. The balance sheet shows current assets amounting to \$85,016 as against current liabilities of \$21,820. Cash on hand is given as \$17,100. Total assets are \$1,948,719, as against \$1,557,532. The milling record shows the average grade of ore to have been \$5.24 per ton, and 35,271 tons of ore were treated. It is anticipated that by July the mill will be treating 180 tons per day, and, if developments warrant, this will be further augmented to 300 tons. The shortage of labor has had a deterrent effect on operations recently, but conditions are somewhat improved now.

#### Huronina.

The Huronia Mine, located in the Larder Lake district, has been taken under option by Montreal financial interests, and arrangements are being made for active development. The career of the property has been of a very checkered character. A mill was installed which never gave entire satisfaction and at times considerable high grade ore was encountered and a number of small gold bars have been turned out. The Timmins interests held an option on the Huronia at one time and considerable diamond drilling was done. A number of commercially valuable ore-bodies were encountered, but for various reasons the option



was not taken up, and the property has remained idle for some time. The holders of the present option will commence work immediately and hope to place the mine on a profit-earning basis.

#### **Porcupine Miracle.**

It is reported that the Porcupine Miracle Mining Company will resume operations before the end of June. A mill with a capacity of 150 tons per day was erected about two years ago and ran for about three weeks, when operations were discontinued. Two shafts have been sunk on the property. No. 2 shaft was put down a depth of 200 ft. and upwards of 600 ft. of lateral work was done. No. 4 shaft reached the 76-ft. level before the mine closed. In both these workings results were said to be very satisfactory. Altogether thirty-eight veins have been uncovered, the majority of which have only been explored on the surface. A saw-mill with a capacity of 6,000 ft. per day was also installed, as also was an electric lighting plant which supplies the mine with light. The mining equipment is complete in every department, including an assay office and laboratory, two 100-h.p. boilers and four-drill compressor, hoists, etc. The property is situated on the west branch of the Night Hawk river in the Township of Langmuir, and consists of approximately 480 acres. It is owned by a closed corporation.

#### **Aurum.**

Plans for more aggressive development work on the Aurum property in Munro Township close to the famous Croesus mine are now being arranged. A vein about four feet in width has been uncovered for a distance of over 200 ft. and is said to contain very good values.

#### **Lucky Baldwin.**

The shaft at the Lucky Baldwin property has now reached a depth of about 50 ft. The vein dipped out of the shaft at the depth of 40 ft. It is intended to sink the shaft to 300 ft. and establish a station at each 100 ft., from which lateral work will be carried on. The small steam plant recently installed is giving good satisfaction. The formation of this section is similar to that of the Kirkland Lake district and is thought to be an extension of the auriferous zone beginning in Lebel, crossing Teek Township, the north-east corner of Eby and the southwest corner of Grenfell. In the latter township the belt is comparatively narrow, but in places is found to be two miles in width in the other townships. Should the Lucky Baldwin prove a success, the intervening distance between the big Kirkland Lake properties and this one will be considered very promising, and it would not be surprising if a number of good properties were located between the two points.

#### **Kenabeek.**

The outlook at the Kenabeek Consolidated property in Auld Township is considered promising. In the crosscut about forty-six feet from the shaft a vein about two inches in width carrying leaf silver, cobalt and niccolite was cut. Within a few days it is expected the No. 3 vein, which is in evidence on the surface will be encountered. The crosscut is now about sixty feet from the bottom of the shaft. The No. 1 vein at the bottom of the main shaft was found to have cut off and faulted about forty feet towards the last vein encountered. Where picked up, however, the vein continues downward and is considered very promising.

#### **Gowganda.**

A new company, known as the T. C. 177 Mining Company, controlled by New York mining interests, and owning forty-two acres in the Gowganda district, adjoining the Miller Lake-O'Brien, has installed a

small plant and sinking operations are under way. A gang of ten men are employed on the property and a contract has been let to sink the shaft to the 300-ft. level, where lateral work will be undertaken. Already five veins which contain native leaf silver, have been uncovered, and a number of others showing cobalt and niccolite have been located.

#### **Davidson.**

Favorable results are being met with in the diamond drilling being done on the Davidson property in Porcupine. A drill working at the 300-ft. level of the mine is said to have encountered a body of ore upwards of twenty-five feet in width, in the walls of which free gold occurs. The average assay of the whole body however, has not been officially given out. The vein was located 186 feet from the 300-ft. level of the property.

#### **Porcupine-Penn.**

A new company, known as the Porcupine-Penn Mining Company has been formed to work the group of claims known as the Clerihue claims, in Ogden Township. The property consists of fifteen claims embracing approximately 600 acres.

#### **Murray-Mogridge.**

The machinery has arrived at the Murray-Mogridge and the shaft is being sunk at the rate of about four feet per day. At present the shaft is down about 80 ft. It is intended to establish a station at each 100 ft. and prosecute lateral work. The shaft will be sunk to the 300-ft. level as quickly as possible. The vein on the surface has been traced for a distance of 3,000 ft. and at the narrowest point is several feet in width. This is one of the largest veins uncovered so far in the north country.

#### **Tough-Oakes.**

The Tough-Oakes Mining Company, the pioneer mine of the Kirkland Lake district, is now understood to be producing at the rate of upwards of \$2,000 per day in gold bullion. The mill is running at a capacity of 120 tons per day and the recovery is averaging around 97 per cent. The tailings from the original mill are re-treated, and are being fed direct to the tube mill without going through the crusher or ball mill. The Tough-Oakes mine is considered to be one of the most completely equipped in the country. From two to four men are all the staff required in the mill. The present vein system consists of about fourteen veins running parallel, and the ore reserves approximate over a million dollars. A shaft is now being sunk on the No. 1 vein, and has reached a depth of nearly one hundred feet. About two hundred men are on the company's pay-roll, at the present time. About fifty more men could be used, and machines and equipment for this number are at the property; but owing to the scarcity of labor exploration work is being retarded. The power plant consists of two 250-h.p. compressors driven by electricity.

#### **Kirkland Townsite.**

A vein containing molybdenite has been uncovered on the Kirkland Townsite property, and although no free gold or high values have yet been encountered, the surface indications on the property are very promising. A shaft is being sunk and a number of good veins are in evidence, and the property has the appearance of developing into an important one. A large force of men are engaged.

#### **Gold Reef.**

Mining operations at the Porcupine Gold Reef property are being carried on under unique conditions for the North Country. The property has been under lease on a royalty basis for the past year and the men



who have been working it have been practically carrying on placer mining, the only difference being that the quartz was first blasted out of the veins. The main vein on which the bulk of the work was done is three inches in width and carried values as high as \$5,000 to the ton, while throughout this vein was very rich. T. J. Wright and four practical miners were able to make very good wages from their operations. The ore when blasted out of the rock is crushed by hand in a mortar, the resulting fines are then passed through a rocker, the waste removed and the gold is finally collected by amalgamation.

About 100-ft. south of this working is a vein five feet in width which can be traced for a considerable distance. A test pit has been sunk on this vein, and while it is well mineralized, it was found to contain very low gold values.

#### **Wright Claims.**

Results of recent test shipments from the Wright claims in the Township of Whitney, near Bobs Lake, have been so encouraging as to give encouragement for the installation of a small mill, which it is understood will take place in the very near future. A large dike of pyrites on the property will be more thoroughly explored.

#### **McLean Claims.**

A small gang of men are at work sinking a test pit on the McLean claims in the Township of Turnbull. Exploration work to the present time has proven very favorable. A test pit is being sunk on a well mineralized vein in which a little free gold is found at times. The vein cuts through the quartz porphyry formation. The McLean claims are owned by a syndicate of Pembroke men.

#### **Sylvanite.**

Operations on the Sylvanite property at Kirkland Lake have been suspended for the time being. The main shaft which had reached a depth of close to 100 feet was sunk between two veins. At the bottom of the shaft a crosscut was driven both north and south and the north vein where encountered about thirty-five feet from the shaft was found to be about eighteen inches in width and carried free gold and molybdenite. The other vein was located about the same distance to the south of the shaft, but was not quite so wide as the south vein. The formation and values encountered in the two veins were very similar to that found on the Tough-Oakes, containing free gold and molybdenite. No announcement has been made as to when operations will likely be resumed.

#### **Miniker-Kirkland.**

Up to the present some fifteen veins have been uncovered in development work on the Miniker-Kirkland property, and a small amount of free gold is showing in a number of the veins, which are well mineralized and characteristic of the Kirkland Lake producing area. The Miniker is south of and adjacent to the Lake Shore mines and as the veins on this property have a northeast by southwest drift it is considered highly probable that they will extend into the ground owned by the former company. A shaft is now being sunk on a promising vein. A number of men are also employed in clearing the land and already a large amount of the claims have been cleaned up. The main road from Swastika passes within a hundred feet of the north boundary of the property, and the camp buildings are located within a hundred yards of this road.

#### **Lake Shore.**

The Lake Shore Mine at Kirkland Lake is fast developing towards the producing stage. A large portion

of the machinery for the mill has been transported to the mine. The new installation will be similar to the mill now in operation at the Schumacher mine in Porcupine and will handle between 75 and 100 tons of ore per day. The process will be continuous counter current decantation.

Upwards of 3,000 feet of development work has been done and more than a thousand tons of ore between \$12 and \$14 per ton has been placed on the dumps. The main workings have reached the 300-ft. level of the mine and at this point the values were found to be higher than at the preceding level of 200 ft. At the 200-ft. level a crosscut has been driven north underneath the lake and two large veins were encountered. A drift has been driven 520 ft. on this vein and an ore shoot about four feet in width and 300 ft. in length has been opened up. At the 300-ft. level about 900-ft. of drifting has been done and the grade of ore has been determined to be of a higher grade than that on the 200-ft. level. At times the ore in the Lake Shore is very rich and a short time ago a sample which was considered to be the richest piece of ore ever found in the North Country was taken from this property.

Development work is proceeding rapidly and the results being met with are highly satisfactory. The Lake Shore is located between the Teek-Hughes and the Wright-Hargraves, and will benefit to a certain extent by the developments on these properties.

#### **Chambers-Ferland.**

Values obtaining on No. 18 vein of the Chambers-Ferland property of the Cobalt Aladdin Mining Company, about thirty feet above the contact in places run upwards of two and three thousand oz. of silver to the ton. The wall rock on both sides of the vein for a considerable distance also carries good milling values. This vein has every appearance of becoming one of the most important so far discovered on the property, and at the present time is showing up exceedingly well.

#### **Belle Ellen.**

The main workings of the Belle Ellen Mine in South Lorraine have now reached a depth of approximately 500 ft., and the shaft will be continued to the contact, which it is expected will be encountered at about 580 ft. The main vein which dipped out of the shaft some distance above the present depth is thought to be paralleling the shaft at a distance of about ten to fifteen feet. After reaching the contact a crosscut will be run to encounter this vein and determine the values at the new level. Work at the Belle Ellen is proceeding in a very satisfactory manner.

#### **The Labor Situation.**

Since the last issue of the Mining Journal the labor situation in the North Country is showing some signs of improvement and while there is very little scarcity of skilled mechanics, there is still plenty of room for a large number of muckers and rough laborers. The cry for men comes chiefly from the Porcupine and Kirkland Lake districts, and while energetic steps have been undertaken to get the required number it is only within the past couple of weeks that the results have been at all encouraging. The McIntyre Mine is about the only mine in the Porcupine district that has a full complement of men.

A meeting of the Miners' Unions throughout the North Country was held on the 17th and the demands for the adoption of the new schedule of wages recently submitted to the Mine Managers' Association was the subject for discussion.



### Gold in Boston Township.

Recent important discoveries of gold in Boston Township augur well for the future of the district as a whole. Three important new discoveries have been made since the snow left the ground. The first of these new finds was on the Boston-Hollinger, which was a remarkably rich vein and is being developed at the present time. The second discovery was in the northeast corner of Pacaud Township close to the Boston line and was made on the Charleboise claims. This find also is reported to be very rich, carrying heavy in free gold. The third discovery followed closely on the other two, was made on the Charette claims a little east of the centre of Boston Township, and is reported to be very rich. A considerable amount of work has been done on these claims from time to time and a large number of test pits have been sunk on the property, but this is the first find of importance that has been made.

A large number of small operations are under way at the present time and before the snow flies again the camp will undoubtedly have become considerably advanced.

### Silverado.

The installation of the plant at the Silverado is well under way and before the summer is much further advanced a large force of men will be employed here.

### BRITISH COLUMBIA.

At the time of writing there is no change for the better in the situation so far as the strike of mine employees in the Crowsnest district of British Columbia is concerned. Mr. R. F. Green, M.P. for Kootenay electoral district, acting under authority from the Dominion Government, has been endeavoring to bring about a settlement of the matters in dispute between the United Mine Workers of America and the coal-mine operators, but no favorable result has yet been announced. Meanwhile work is being continued at mines in Ainsworth, Sloean, and Nelson districts, but there has not yet been a resumption of ore-production at Rossland mines, nor at the Granby Consolidated Company's big copper mines in Boundary district.

A review of mining sent out by the Spokane News Bureau, gives some information concerning dividends paid during the first half of 1917 by metalliferous mining companies operating in British Columbia. This assumes that the Hedley Gold Mining Company will at the end of June pay its customary quarterly dividend amounting to \$60,000, which it very probably will do.

The dividend payments during the expired portion of the current year are shown to have been as under:

Mining Company.	First Quarter.	Second Quarter.
Consolidated M. & S. Co.....	\$210,695	\$260,447
Granby Consolidated Co.....	374,962	374,962
Hedley Gold Mining Co. ....	60,000	60,000
Rambler-Cariboo Mines, Ltd...	.....	17,500
Standard Silver-Lead Co.....	.....	100,000
Utica Mines, Ltd. ....	.....	32,000
	<hr/> \$645,657	<hr/> \$844,909

The total for the half-year is, therefore, \$1,490,566, according to the foregoing statement, but there is at least one omission, namely, that of the Le Roi No. 2, Limited, which on March 31 paid an interim dividend of one shilling a share, less income tax, the equivalent of which has in other years been shown as having been \$29,220, which would bring the half year's total to \$1,519,786. This compares with \$2,800,946 for the whole of 1916, and with \$1,586,820 for 1915, these two yearly totals being those printed in the official "Preliminary Review" for 1916, issued by the Provincial Bureau of Mines last February.

### PERSONAL.

Col. Thomas Cantley has resigned as president of Nova Scotia Steel and assumed the office of chairman of the board of directors.

Mr. Frank H. Croekard, vice-president of Tennessee Coal, Iron and Railway Co., has been elected president and general manager of Nova Scotia Steel Co.

Mr. W. F. Jahn, mill superintendent at Tough-Oakes gold mine, has resigned to join the U. S. army. He is succeeded by Mr. A. H. Swanson, formerly of the McIntyre.

Mr. Vic Emery of the Hollinger staff, has resigned to enlist in the C. E. F.

Mr. Percy Hopkins of the Ontario Bureau of Mines, is at Tashota examining gold properties.

Mr. A. G. Burrows of the Ontario Bureau of Mines, is examining properties in Powell Township.

Mr. Edward Holgate, who has been chief draftsman with the Structural Steel Company of Montreal for the past seven years, has accepted a position as chief engineer with MacKinnon, Holmes & Company, Limited, of Sherbrooke, Que.

Mr. J. B. Tyrrell has been appointed Canadian representative for the Consolidated Mines Selection Co. of London, Eng.

Mr. Douglas A. Mutch, manager of the Hudson Bay Mines, Ltd., at Cobalt, has been appointed consulting engineer for the Dome Lake Mining & Milling Co., South Porcupine.

Mr. W. M. Brewer, of Victoria, has been appointed resident engineer in charge of one of the new mining districts under the Mineral Survey and Development Act of British Columbia.

Mr. Thos. Kiddie, a well-known metallurgist for years actively associated with smelting works in British Columbia, is on a visit to Vancouver. His home is now at Alhambra, California.

Mr. Thos. R. Stoekett, of Nanaimo, B.C., has resigned as manager of the Western Fuel Company, owning big coal mines at and near Nanaimo, Vancouver Island.

Mr. F. S. Falconer, of the Topographical Division of the Geological Survey of Canada, is this season doing field work about Hazelton, Skeena region of British Columbia.

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### MINES BRANCH

#### Recent Publications

The Nickel Industry: with special reference to the Sudbury region, Ont. Report on, by Professor A. P. Coleman, Ph.D.

The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.

Building and Ornamental Stones of Canada (Quebec). Vol. III. Report on, by W. A. Parks, Ph.D.

The Bituminous Sands of Northern Alberta. Report on, by S. C. Ellis, M.E.

Peat, Lignite and Coal: their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.

Annual Report of the Mineral Production of Canada During the Calendar Year 1914 by John McLeish, B.A.

The Petroleum and Natural Gas Resources of Canada: Vols. I. and II., by F. G. Clapp, M.A., and others.

The Salt Industry of Canada. Report on, by L. H. Cole, B.Sc.

Electro-plating with Cobalt. Report on, by H. T. Kalmus, Ph.D.

Electro-thermic Smelting of iron Ores in Sweden. Report on, by A. Stansfield, D.Sc.

Non-metallic Minerals Used in Canadian Manufacturing Industries. Report on, by H. Frechette, M.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

**Fuel Testing Laboratory.**—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.

**Ore Dressing Laboratory.**—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.

**Chemical Laboratory.**—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.

**Ceramic Laboratory.**—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.

**Structural Materials Laboratory.** Experimental work on sands, cements and limes is also undertaken.

Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa

### GEOLOGICAL SURVEY

#### Recent Publications

Memoir 64. Preliminary Report on the Clay and Shale Deposits of the Province of Quebec, by J. Keele.

Memoir 74. A List of Canadian Mineral Occurrences, by Robert A. A. Johnston.

Memoir 77. Geology and Ore Deposits of Rossland, British Columbia, by C. W. Drysdale.

Memoir 82. Rainy River District of Ontario. Surficial Geology and Soils, by W. A. Johnston.

Memoir 84. An Exploration of the Tazin and Taltson Rivers, Northwest Territory, by Charles Camsell.

Memoir 85. Road Material Surveys in 1914, by L. Reinecke.

Memoir 87. Geology of a Portion of the Flathead Coal Area, British Columbia, by J. D. Mackenzie.

Memoir 88. Geology of Graham Island, British Columbia, by J. D. Mackenzie.

Memoir 89. Wood Mountain-Willowbunch Coal Area, Saskatchewan, by Bruce Rose.

Memoir 92. Part of the District of Lake St. John, Quebec, by John A. Dresser.

Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.

Memoir 94. Ymir Mining Camp, British Columbia, by Charles Wales Drysdale.

Memoir 95. Onaping Map-Area, by W. H. Collins.

Map 59A. Wheaton, Yukon Territory.

Map 60A. Wheaton, Yukon.

Map 67A. Kirkfield Sheet, Victoria County, Ontario.

Map 150A. Ponhook Lake Sheet, Nova Scotia.

Map 175A. Ymir, Kootenay, British Columbia.

Map 176A. Graham Island, Queen Charlotte Islands, British Columbia.

Map 177A. Southern Portion of Graham Island, Queen Charlotte Islands, British Columbia.

Map 180A. Espanola Area, Sudbury District, Ontario.

Map 184A. Roberval, Lake St. John County, Quebec.

Map 187A. Southern Plains of Alberta.

Applicants for publications not listed above should mention the precise area concerning which information is desired.

Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to The Director, Geological Survey, Ottawa





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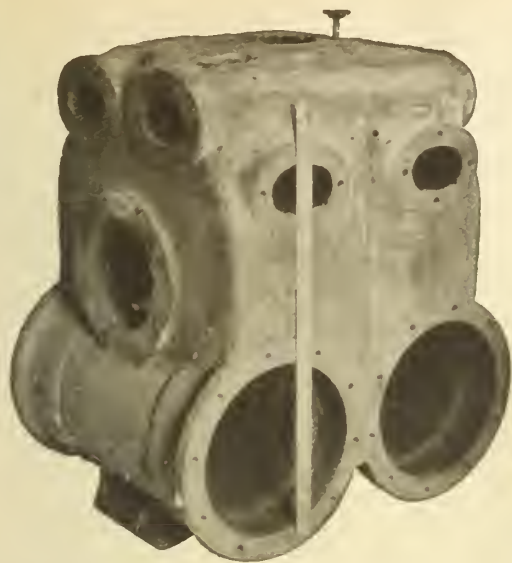
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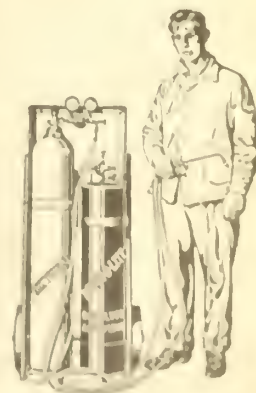
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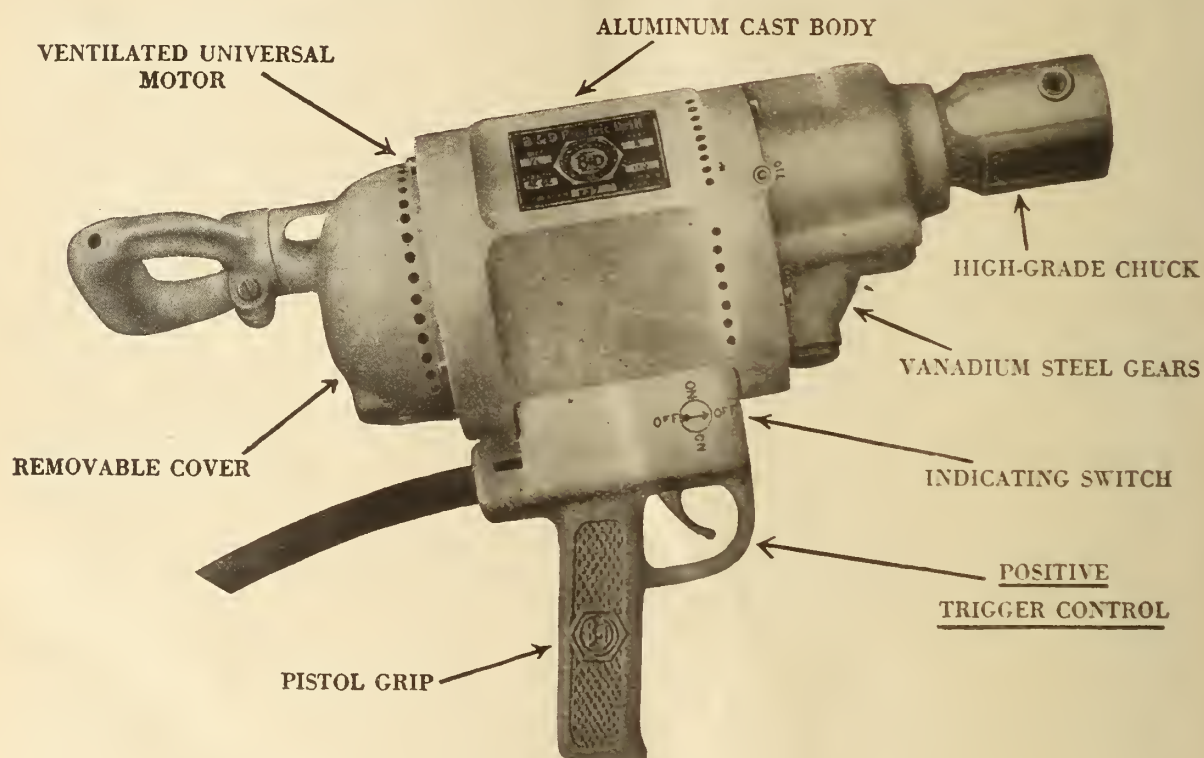
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On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

### NOTICE

Notice is hereby given that we will enforce our patents and stop all infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

Notice is further given that no one is authorized to introduce our processes or apparatus into the United States, Canada or Mexico.

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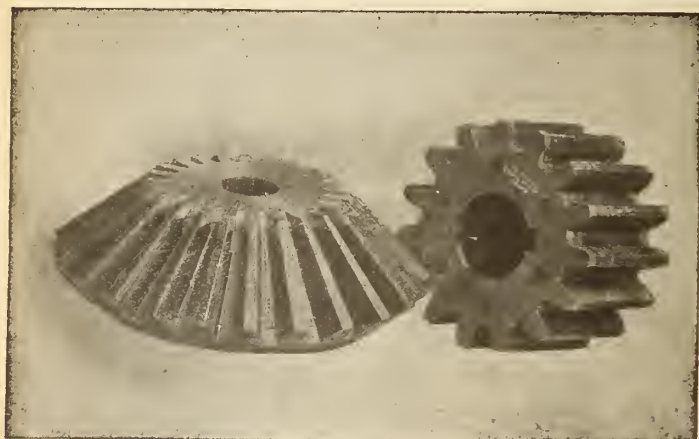
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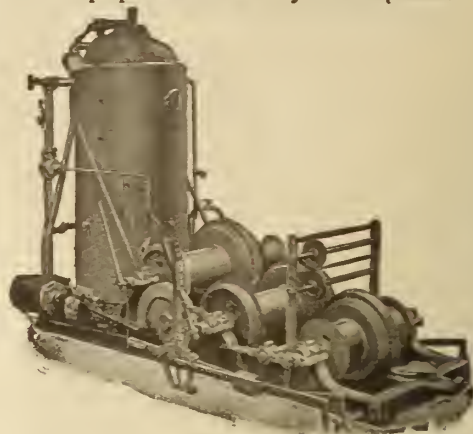


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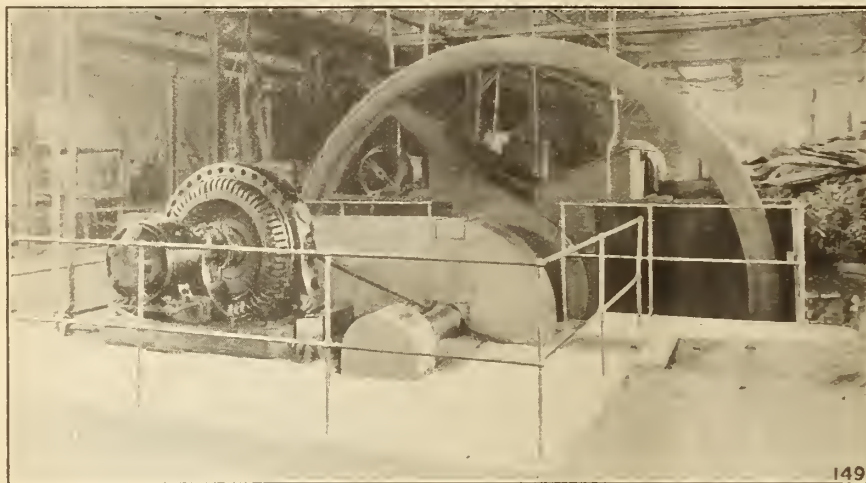
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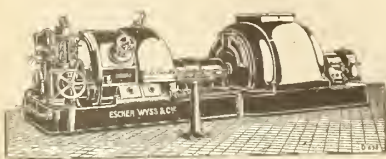
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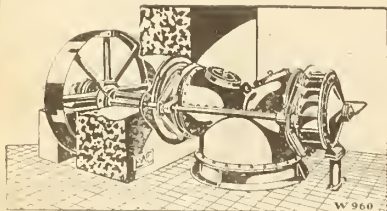
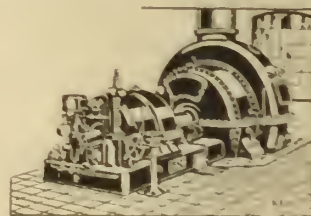
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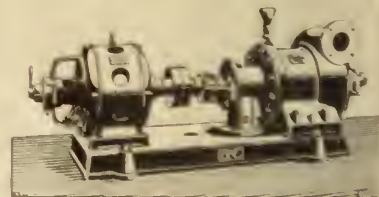
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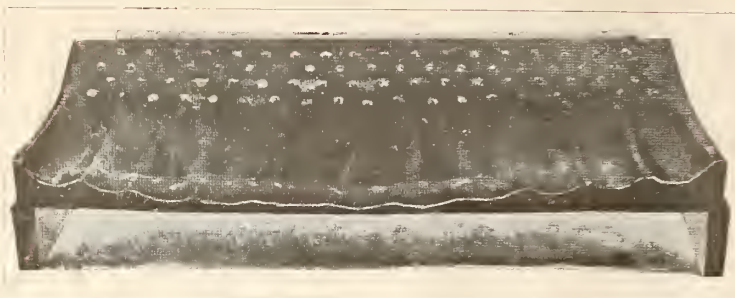
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The Bituminous Sands of Northern Alberta. Report on, by S. C. Ellis, M.E.

Peat, Lignite and Coal: their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.

Annual Report of the Mineral Production of Canada During the Calendar Year 1914 by John McLeish, B.A.

The Petroleum and Natural Gas Resources of Canada: Vols. I. and II., by F. G. Clapp, M.A., and others.

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Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.

Memoir 94. Ymir Mining Camp, British Columbia, by Charles Wales Drysdale.

Memoir 95. Onaping Map-Area, by W. H. Collins.

Map 59A. Wheaton, Yukon Territory.

Map 60A. Wheaton, Yukon.

Map 67A. Kirkfield Sheet, Victoria County, Ontario.

Map 150A. Ponhook Lake Sheet, Nova Scotia.

Map 175A. Ymir, Kootenay, British Columbia.

Map 176A. Graham Island, Queen Charlotte Islands, British Columbia.

Map 177A. Southern Portion of Graham Island, Queen Charlotte Islands, British Columbia.

Map 180A. Espanola Area, Sudbury District, Ontario.

Map 184A. Roberval, Lake St. John County, Quebec.

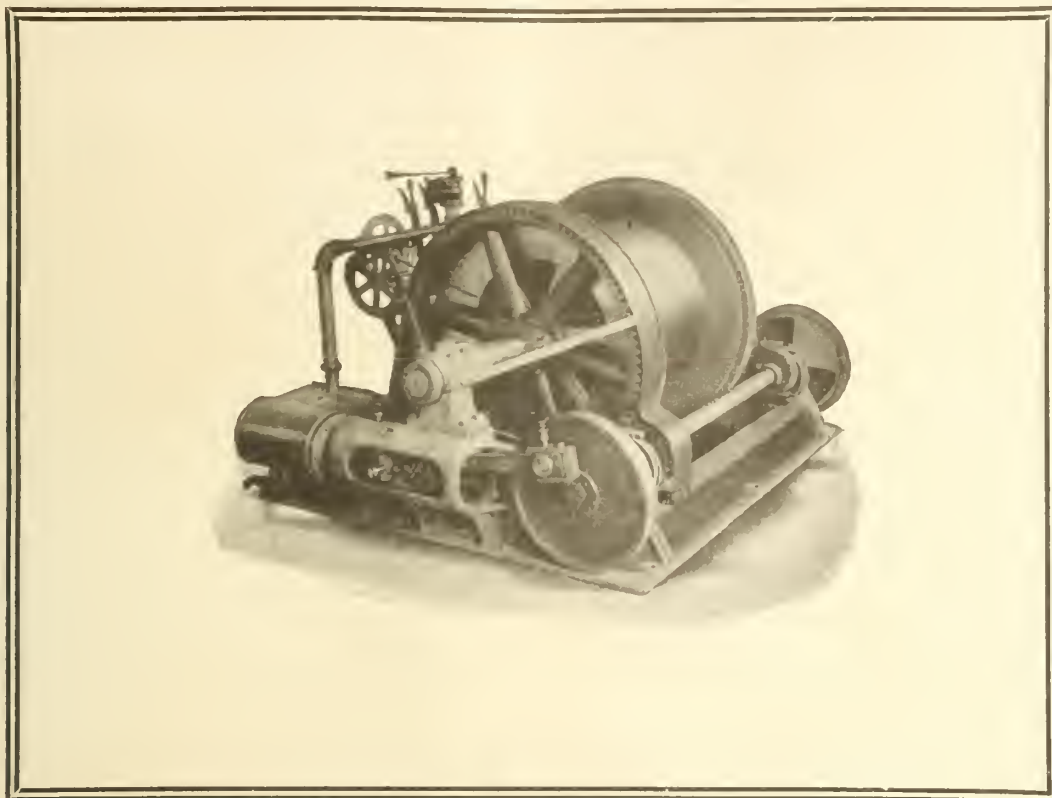
Map 187A. Southern Plains of Alberta.

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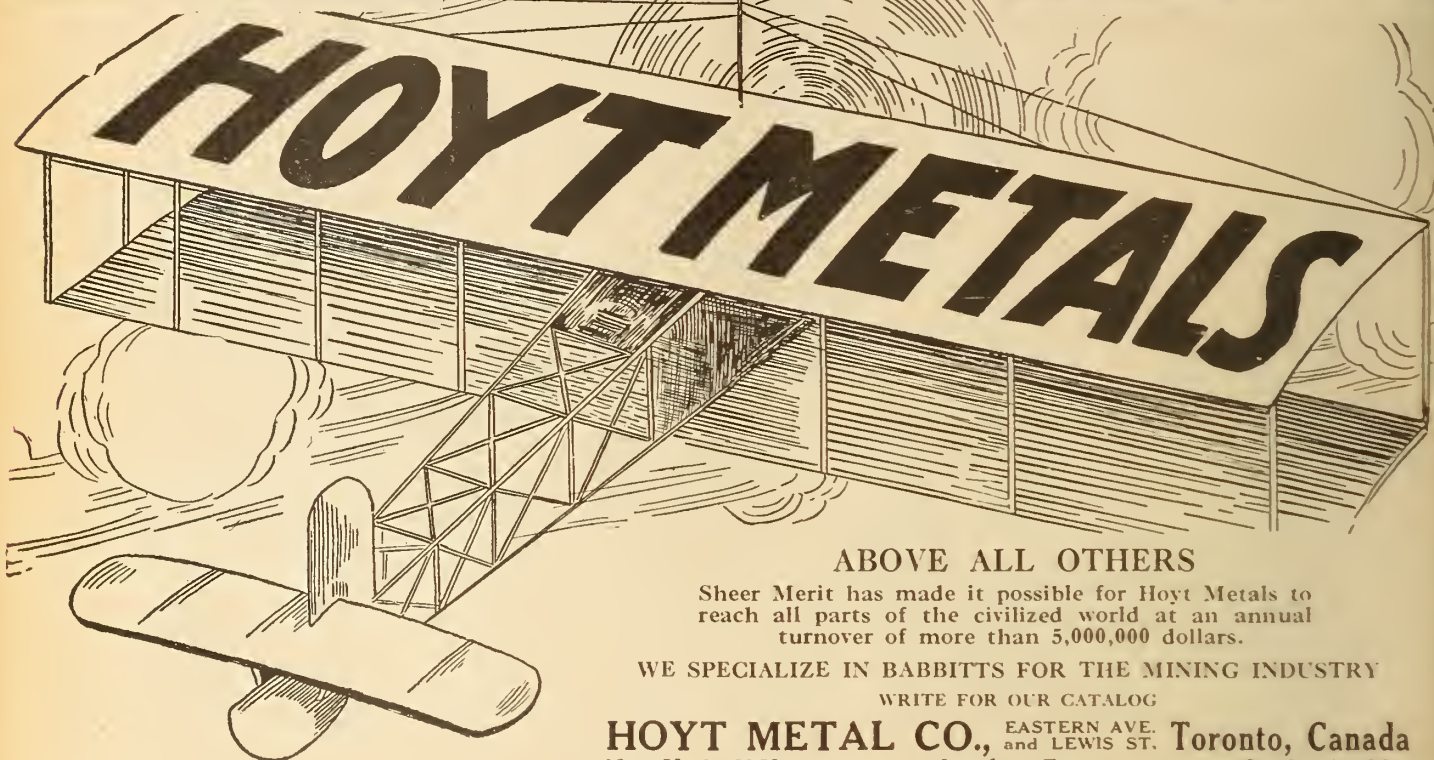
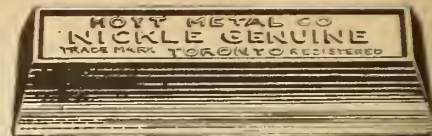
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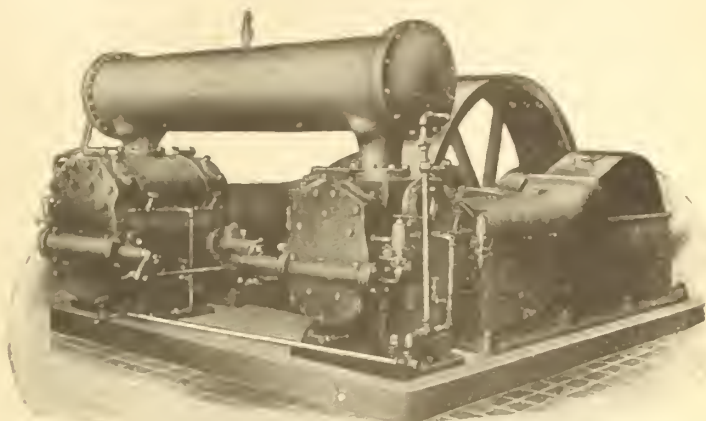
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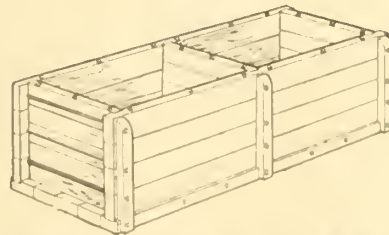
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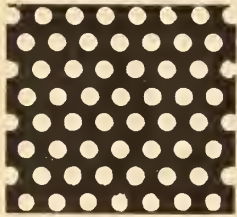
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The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

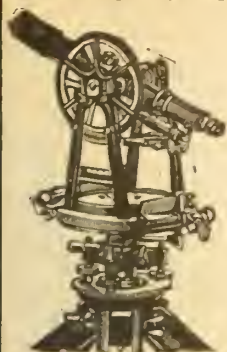
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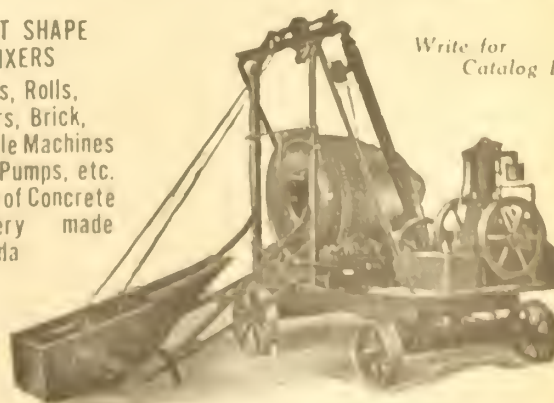
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# THE CANADIAN MINING JOURNAL

VOL. XXXVIII.

TORONTO, July 15th, 1917.

No. 14

## The Canadian Mining Journal

With which is incorporated the  
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada.

Published fortnightly by the

**MINES PUBLISHING CO., LIMITED**

Head Office . . . . 263-5 Adelaide Street, West, Toronto

Branch Office . . . . 600 Read Bldg., Montreal

Editor

**REGINALD E. HORE**

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### CIRCULATION

"Entered as second-class matter April 23rd, 1908, at the post office at Buffalo, N.Y., under the Act of Congress of March 3rd 1879."

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### DEVELOPMENT OF RESOURCES.

We reprint in this issue from the "Financial Times," London, accounts of the establishment in London of an Imperial Mineral Resources Bureau and the proposed formation of an Imperial Development Board. Such accounts indicate that there are people in England who are alive to the desirability of encouraging development of the mineral resources of the Empire.

Recognition of the necessity of developing basic industries has been more general throughout the Empire during the past two years. In Canada recognition of the fact has however not been followed by as much organized effort as is desirable. It is true that much has been accomplished by various groups of men; new industries have been established and a better and more accessible inventory of our resources is being made. But Canadians should be considering more seriously the future development of our mineral resources. We should be more actively engaged in determining what our resources are and in developing them. We should aim to supply the Empire with a much larger portion of the minerals it needs.

The establishment of an Imperial Mineral Resources Bureau in London affords Canada an opportunity of informing citizens of the Empire concerning our resources. Should we not consider this as an opening that should be eagerly seized? The success of the Bureau insofar as Canada is concerned will not depend so much on the initiative of those in London as on the ability of Canadians to keep the Bureau informed on Canada. Should we not see to it that we are ably represented on the Bureau and that we vigorously support our representatives? What are we going to do about it?

### THE NEED OF A MINISTER OF MINES.

It is obvious that if Canada is to take its proper place in the Empire as a producer of minerals we must have government recognition of the fact that mining is one of Canada's chief industries. We must have a strong Mines Department and a real Minister of Mines. We have long since passed the stage when the portfolio of Minister of Mines could properly be held by the holder of any other portfolio.

It is well known that our Mines Department does a great deal of useful work; that many well trained technical men are on its staff and that these men are faithfully discharging their duties. It is however, just as well known that our governments choose to ignore the Department of Mines. The men chosen to be Ministers of Mines are not expected by the government to devote serious attention to the Department. Half the time few of those interested in mining know who is Minister of Mines at Canada. A natural result of the present system is that the Ministers of Mines are content to do the routine work of the De-



partment. They have other work which they evidently regard as of greater importance than the development of our resources. They cannot be expected to lead in a campaign for quicker development and wider utilization of Canadian ores.

If we are to have recognition throughout the world as a mining country we should have recognition at Ottawa. To obtain recognition at Ottawa we apparently need united effort on the part of those most directly concerned. Would it not be well for Boards or Trade in mining districts and the mining societies to press more strongly on members of parliament, and particularly on the Government, the inadequacy of the present system, and the good results that would come from devoting greater attention to organization for the development of resources?

### THE PHOSPHATE DISCUSSION.

It has been brought to our attention that in a reply published in our May 15 issue, to a letter by James White, we have made statements which should be retracted.

In the reply referred to, we said:

"The Commission, apparently in ignorance of the work which has been done, undertook the task of prospecting for phosphate and succeeded in finding a phosphate boulder near the geological horizon at which phosphate beds are known to occur in the western States. They gave out a statement to the daily press reporting their discovery.

"Mr. Ferrier, a former officer of the Geological Survey, noting the press report, went to Ottawa and advised one of the Commission's officers that he had carefully prospected the area in question and had discovered not only boulders but beds of phosphate there. He was able to advise this officer that the deposits had been carefully traced, sampled, analyzed and tested by concentration devices and found to be of no value. The beds are too thin and too low grade to be of commercial importance. Mr. Ferrier did not give this information out for publication; but doubtless hoped that the facts he presented would prevent rash statements being made by the Commission regarding the possibility of locating economic deposits of phosphate.

"Evidently, however, the Commission thought that the public would not think much of a report on the discovery of phosphate unless it were painted in glowing phrases, and the report issued contained no suggestion of the unpleasant facts.

"In view of the facts, Mr. White's denial of the warning given is an indication that he did not believe that the facts were known."

We regret that we have been unfair to the Commission and to Mr. Ferrier in making these statements. We therefore desire to retract them and to apologize to the Commission and to Mr. Ferrier.

### NEW GAS WELL.

Hamilton, July 4.—The National Gas Company has struck a well on the farm of William Pettigrew, Seneca, with a flow of 1,000,000 feet a day. James Dixon says the company will be in a position to supply considerable gas to householders. The well was found in an entirely new field.

## CORRESPONDENCE

### The Dome Report.

Editor Canadian Mining Journal:

Sir,—In your publication of July 1st, 1917, we note two articles referring to the Dome Mines Company, Limited, on which we wish to comment.

Under the heading "Development and Mining" in our annual report of March 31st, 1917, we distinctly state our estimate of ore reserves at that time, and also call the attention of our stockholders to the great difficulties under which we are at present laboring to keep up development work. We endeavored to show that, although, owing to a shortage of labor, actual ore deposits had not been proved to the point where we should feel justified in adding them to our estimated ore reserves, extensive diamond drilling indicated that our orebodies were intact at lower levels, and we believed we had discovered a new orebody below the seventh level of large extent. Under the section relating to "Diamond Drilling" operations in our report we gave detailed logs of the individual holes of consequence for the purpose of impressing upon our stockholders what may be expected when we are again able to obtain our full quota of miners and muckers and development can be resumed to the fullest capacity.

The totals given as estimated ore reserves contain only such blocks of ore as are customarily treated as ore reserves and consist of ore which has been proved, beyond any reasonable doubt, to be ore. They do not contain any orebodies which have been encountered in diamond drilling.

The labor shortage has caused not only curtailment of development but has also occasioned a rearrangement of operating conditions. With normal working units we are able to select our ore from different workings and thereby hold a uniform grade. Under present conditions, as it takes a certain tonnage to enable us to operate our mill economically, we are unable to choose; but must obtain ore from those workings which produce the largest tonnages according to the number of miners at work thereon, irrespective of grade. Consequently we are forced to draw heavily from our pits, the lowest grade ore in the mine.

Our directors feel that everything possible under the circumstances, has been done, and they feel convinced that if it had not been for the unusual shortage of labor the Dome Mines would have made a more favorable showing for the past fiscal year than for that previous.

Yours etc.

J. R. DELAMAR, President.

The Dome Mines Company, Limited.

New York, July 9, 1917.

Editor, Canadian Mining Journal:

Sir,—As a regular subscriber I have read with a great deal of interest your articles headed "Independent Reports Needed" and "Estimation of Ore Reserves" in your publication of April 1st and July 1st, respectively. Having large financial interests in various mining companies for precious metals in Northern Ontario, I thoroughly approve of the spirit of your article and shall be glad if such a tendency is encouraged.

Knowing that I was one of the largest owners of shares in Temiskaming Mining Company, which, since the present management got control of the company three years ago, does not inform its stockholders of the amount of ore reserves, I spoke to the president of the company when I met him for the first time, in December, 1915, about ore reserves and was assured that I could get them estimated by an engineer of high repute any time I wish to at my expense. I owned at that time about 65,000 shares.

Various visits to the mine influenced me to increase my holdings to about 140,000 shares in October, 1916. After a visit to the mine at that time I felt seriously inclined to increase my holding of stock in the company very materially. I expressed my intentions to the president of the company then, and I also stated to him that I considered it advisable to accept his proposition made to me the previous December in regard to ore reserves, with the condition that the company get the report from the engineer and be permitted to publish it to all stockholders. I asked the president then to have my request for examination for ore reserves submitted to the board of directors for their assent at its next meeting with the understanding that I myself would bear the full expense of such a report if the company was not willing to share it.

Receiving no reply by November 21st, 1916, I wrote to the president on that day, requesting him for an answer, and also asked him to be good enough to suggest to me the name of an able engineer for the purpose. The reply dated December 1st, 1916, was as follows: "Regarding the selection of an engineer will say, that your request does not seem to meet with universal approval and as I pointed out to you it would mean quite a considerable expense to you as the company would not care to assume the same. What you desire I do not think could be accomplished inside of six weeks and would mean an engineer with several assistants. I had a similar request, as I told you, from another shareholder and when I pointed out these difficulties he quite approved of my position."

I replied on December 5th, requesting the president of the company to bring before the board of directors a reconsideration of my request for permission to have ore reserves estimated and mentioned the names of quite a few prominent engineers of the camp to make a selection from, although I had not spoken of this intention for estimating ore reserve to any of these well known engineers.

I received reply to this second request, dated December 7th, stating that my letter would be laid before the board of directors at the next meeting. Hearing nothing further on the subject I was compelled to assume by the silence that my request for estimating ore reserves had been refused again.

I have always considered the knowledge of positive ore reserves to be a very important factor to guide an investor as to the quality of his investment. All Cobalt companies who really have substantial ore reserves, with the exception of those two companies under the control by the identical same board of directors, viz., Temiskaming and Beaver, give this essential information to their shareholders in their annual reports. I know of many shareholders of the Temiskaming Company who are exceedingly anxious to get such information and they are really entitled to have it just as much as the management itself. I honestly believe that whenever such a report in detail will be issued to the shareholders, it will create a pleasant surprise for them.

This same management, which apparently refused me twice the right of having the ore reserves of the company estimated by an engineer of high standing, although aware of the fact that I was by far the largest owner of shares of the company, saw fit to propose to its shareholders a deal, as outlined in enclosed circular dated February 22nd, 1917, and asked for its approval. In order to protect my true interest in the company against acceptance of such an intensely objectionable proposition, I was compelled to apply at my own expense, unsolicited by anybody, to the court for an injunction against the holding of such special meeting after all effort of my solicitor, Mr. Glyn Osler, for an agreement to adjourn meeting two weeks failed. I also enclose a copy of my affidavit to the court asking for the injunction which was granted by his lordship Justice Latchford. As the object of my action had been accomplished and the company has announced that it would not go on with the proposed deal, I consented some time ago to have the injunction quashed, there being no further need for same.

You may use this letter and enclosed documents, or any part of my lines in any way you care to do so. I hope that such discussion will make independent actions of stockholders more popular and increase the chances of success in operating properties.

Yours, etc.,

A Large Shareholder of Temiskaming

Mining Company.

New York, July 10th, 1917.

#### S. F. KIRKPATRICK WINS McCHARLES PRIZE.

Kingston, July 4.—Professor Stafford K. Kirkpatrick, head of the Metallurgy Department of Queen's University, has been notified by the Board of Governors of the University of Toronto that he has been awarded the McCharles Prize of a gold medal and \$500 in cash for the invention or discovery of a new and improved process for precipitation of silver from its solution in the ores of Cobalt, and also a new and improved process for separation of cobalt and nickel in solution made from Cobalt ores.

#### NEWS FROM THE PAS.

The Pas, June 29. R. H. MacNeill is making arrangements for the active development of his properties at Herb Lake.

M. J. Hackett arrived in town from Herb lake and reports everything going along nicely there.

Professor Brooks is making an exhaustive examination of the Herb lake region in the interest of eastern capital.

I. MacMartin is busy examining the various properties with a view to the purchase of one or more of the likely ones.

Dr. Kitto, of Ottawa, in the service of the Federal Government, is on an inspection tour of the mining districts adjacent to The Pas. He is accompanied by Commissioner J. A. Campbell.

It is reported that the Graham Bros. have optioned their Beaver lake property at a large figure. J. M. Wanless was a prominent figure in the negotiations that resulted in the deal being put through.

Frank Buckle arrived at the camps at Herb lake on Thursday last after a somewhat arduous trip across the portage. He will make a personal inspection of several claims he is interested in, and report to his associates regarding development plans.—The Pas Herald.



### THE ENRICHMENT OF ORE DEPOSITS.

One of the most important of recent geological publications is entitled "The Enrichment of Ore Deposits, Bulletin 625 of the United States Geological Survey." The author, Professor William Harvey Emmons, head of the Geological Department of the University of Minnesota, is to be congratulated on the interesting form in which he presents the information contained in the publication, much of which is derived from researches carried out by himself and his students, and on the fair and judicious treatment he accords to the conclusions of other authors.

There is a tendency for many authors to push too far popular theories, and this has been the case of "enrichment" during late years. Judging from the writings of certain authors, for instance, it is difficult for them to believe that all enrichment or later deposition of ores does not come from the weathering and erosion of orebodies themselves. The theory of downward enrichment is so fascinating to them that they are prone to discard the possibility, or certainty in some cases, of there having been two or more periods of primary mineral-bearing solutions, each of which had its influence on particular orebodies. These "transmigrationists" are inclined to look on all ores of later periods of deposition as having been in a "previous state of existence," as ores in the eroded parts of the deposits in which they are now found. They do not go quite so far as the poet in the lines, "The dust we tread upon was once alive," but almost. Prof. Emmons is not an extremist, or an advocate who "sees only the client's side." He maintains a judicious attitude.

Professor Emmons makes the following distinctions between primary and secondary deposits:

"In this paper I apply the term 'primary' to all bodies of ores whose chemical and mineral composition has remained essentially unchanged by superficial agencies since the ores were deposited. These include ores that have replaced the wall rock and are 'secondary' after rock-making minerals or sedimentary beds. A secondary ore, as the term is here used, is one that has been altered by superficial agencies. The term is not restricted to pseudomorphous replacements but is used to include also material deposited by superficial processes in fractures in and near the primary orebodies.

"Frequently during the primary deposition of lode ores the veins already formed by ascending waters are fractured, and ascending waters again deposit material in the fractures. Such material, although it is later than the ore first deposited, is not to be regarded as 'secondary,' for only rarely is it formed by the solution and redeposition of an earlier ore, and its genesis is essentially similar to that of ore of the period of the earliest deposition. A few investigators, however, use the term 'secondary' to describe such a deposit and some to describe an orebody formed by ascending solutions that replaced the wall rock. It is unfortunate that the term 'secondary' is used with different meanings; but since nearly all writers employ it only to describe the results of downward-moving meteoric waters, reacting in or near an older mineral deposit, I have so restricted its use in this paper. Where the meaning is doubtful I have attempted to avoid ambiguity by using qualifying phrases."

The publication presents in the most serviceable form for all students of ore deposits data on weathering and the chemistry of enrichment. Not the least interesting feature of the book are the brief but well balanced descriptions of ore deposits of various parts of the world. These descriptions will be of service to those who are interested in the science of ore deposits as a whole and not merely in enrichment.

W. G. M.

### FIELD WORK OF THE GEOLOGICAL SURVEY DURING 1917.

The Geological Survey will carry on field work in the various provinces and territories of the country during 1917. The investigations and explorations will be directed mainly to the examination of areas that promise to be of economic value and will embrace particularly a continuation of the exploration of areas that are known to contain, or that may be expected to yield, minerals that are required in the manufacture of munitions and other objects connected with the prosecution of the war.

An investigation will be made into the character of the molybdenite deposits of Quebec and Ontario; and the deposits of tungsten-bearing minerals in Nova Scotia, New Brunswick and Yukon Territory, will receive further attention. The chromite and asbestos areas of Quebec will be studied in greater detail. Certain iron deposits of the Maritime Provinces and British Columbia will be examined. The copper-nickel deposits of the Sudbury district will receive attention and a study will be made of certain gold, copper, and silver-lead and zinc deposits of Nova Scotia, Quebec, Manitoba and British Columbia. Investigations will also be made into the petroleum and natural gas possibilities of Ontario and the prairie provinces, the coal fields of Nova Scotia, Saskatchewan and Alberta, the water supply of southern Saskatchewan and Alberta, the supply of road materials in portions of Quebec, Ontario and Saskatchewan, and the soils of portions of Manitoba.

The work that had been planned for D. D. Cairnes in Yukon Territory will, owing to his untimely death, fall upon the shoulders of William Cockfield, the assistant. Mr. Cockfield will continue an examination of certain auriferous gravels, and devote special attention to areas in which tungsten-bearing minerals are known to occur.

In British Columbia Charles Camsell will make a geological exploration of a belt of country traversed by the Pacific Great Eastern railway between Lillooet and Howe Sound. C. W. Drysdale will make an examination of the geology and ore deposits of the Windermere district, and M. F. Baneroff will examine the Lardeau area. Mr. Drysdale will also make a reconnaissance of portions of the valley of the north Thompson river. J. J. O'Neill will carry on geological work in the Hazelton district. Topographical mapping in this district will be carried on also by F. S. Falconer. The correlation of the Pre-Cambrian and lower Palaeozoic rocks of southern British Columbia will be studied by L. D. Burling, and a search will be made for phosphatic sediments. Bruce Rose will complete the geological mapping of the area in southeastern British Columbia and southwestern Alberta lying between 49 and 50 degrees north latitude and 114 and 115 degrees west longitude.

D. B. Dowling will continue his investigation of the coal resources of Alberta and Saskatchewan and of the occurrence of artesian water in certain dry belts. He will have general supervision of geological work in the



oil, gas and coal fields of western Canada. S. E. Slipper will collect records and all available information regarding borings that are being made in the prairie provinces. A. C. T. Sheppard will make a topographic map of a portion of country underlain by the Belly River formation in western Saskatchewan and eastern Alberta southeast of Edmonton. An examination of this area will be made by J. A. Allan with a view to ascertaining in what portions the geological structure is most favorable to the accumulation of petroleum or natural gas. The Cretaceous formations of the Peace River district will be examined by F. H. McLearn and the Devonian sediments about Great Slave lake by A. E. Cameron. E. M. Kindle will make a stratigraphical and palaeontological investigation of the Devonian rocks on Peace river, Slave river, Great Slave lake and part of Mackenzie river, for the purpose of establishing the age of certain fossil-bearing beds that may constitute horizon-markers in working out the structure of the rocks.

In Saskatchewan A. MacLean will continue the investigation of the coal measures. J. Stansfield will examine into the possibility of obtaining a continuous water supply at a reasonable depth in the section of country to the south of Regina. A survey of the available road material of a certain section of southern Saskatchewan will be made by L. Reinecke.

E. L. Bruce will continue the geological mapping of a portion of Saskatchewan and Manitoba north of Pas and will make a detailed study of the large deposits of copper and zinc. The geological mapping of the gold-bearing region about Wekusko and Reed lakes in northern Manitoba will be made by F. J. Alcock, and of the gold-bearing rocks in the vicinity of Manitogagan lake east of lake Winnipeg by J. R. Marshall. W. A. Johnston will make an investigation of the surface geology and soils of a region in the vicinity of lake Winnipegosis for the purpose of delimiting areas suitable for cultivation. He will also make a reconnaissance soil survey of a belt extending along the Hudson Bay railway.

The copper-nickel deposits of Ontario will be investigated in detail by W. H. Collins, who will also continue his work on the correlation of the Pre-Cambrian formations about Lake Huron. A portion of Renfrew county including some molybdenite deposits will be examined by M. E. Wilson. H. C. Cooke will make a geological map of an area in the vicinity of Fort Matachewan and T. L. Tanton will make a similar map of a belt about 20 miles wide lying along the Canadian Northern railway east of Nipigon. In both parts of the province attention will be paid particularly to the delimitation of belts that give promise of yielding minerals of economic value. A study of the surface geology and soils along the Canadian Northern railway east of Nipigon will be made by I. E. Stewart. R. C. McDonald will make a geographical map of a portion of the districts of Algoma and Thunder Bay. M. Y. Williams will carry on investigations into the stratigraphy and structure of the sedimentary rocks of southwest Ontario with a view to ascertaining the possibility of increasing the oil and gas producing areas. W. H. Boyd and K. G. Chipman will map a portion of Renfrew county and L. Reinecke will make a survey of road materials in the eastern part of Ontario.

An investigation will be made by M. E. Wilson into the character of the molybdenite deposit at Quyon, Quebec, and the neighbouring area will be geologically mapped. Robt. Harvie will complete his work on the

asbestos areas of Quebec and will make an investigation of the chromite-bearing rocks of the Eastern Townships. E. Poitevin will examine into the question of the genesis of the chromite of the Black Lake district. A survey of road materials in the vicinity of Montreal will be made by L. Reinecke and work on certain asbestos and copper areas will be carried on by J. K. Knox.

Geological mapping in central New Brunswick will be carried on by G. A. Young, who will pay special attention to the contact of the granite intrusives with the intruded rocks. An investigation will also be made into the character of the tungsten deposit on the southwest branch of Miramichi river. An examination of iron-bearing areas of New Brunswick will be made by A. O. Hayes.

E. R. Faribault will continue mapping the gold-bearing series of Nova Scotia and will carry on further investigation of the deposits of tungsten-bearing minerals at Moose river and Scheelite. D. A. Nichols will map the geographical features of a portion of Cape Breton Island in the vicinity of Mira bay. A. O. Hayes will map the geology of this area and will also investigate iron and other ore deposits in Nova Scotia.

### WORKING ON ELECTRIC FURNACE PROBLEMS.

Through a co-operative agreement with Cornell University representatives of the U. S. Bureau of Mines of the Department of the Interior have been stationed at Morse Hall, where the electric furnace equipment of the Department of Chemistry of the University has been utilized in some of the metallurgical work of the Bureau.

The main investigation, which has occupied several years and is now nearly finished, has been a study of the electric melting of brass. The furnaces now used in the brass industry cause a large loss of metal by volatilization, and require crucibles, which have become very costly since the outbreak of the war. Long series of experiments have indicated that the use of a suitable electric furnace might materially reduce the metal losses and avoid the use of crucibles. The U. S. Bureau of Mines is now testing an electric furnace built on the design worked out in the laboratory tests. This furnace is of commercial size, is installed in a brass foundry, and is being tested with special attention to its suitability for use on such brasses as are used for cartridges and shrapnel cases.

Another electric furnace problem studied by the Bureau has been the production of ferro-uranium from the uranium oxide obtained as a by-product in the extraction of radium from its ores. Ferro-uranium is used in making uranium steel, which is said to be used by Germany for the liners of big guns which will stand up at a rate of fire so rapid that other steels fail.

As soon as the test on the large brass furnace is completed, work will be begun on the production of sample lots of uranium steel and other special steels for test by the Bureau of Ordnance of the U. S. War Department as to their suitability for use in guns. The work on gun steel will also require the use of electric furnaces. It has not yet been decided whether this work will be done at Cornell or at one of the other Universities which have offered facilities for this work.

Various other problems incident to the main investigation mentioned above have been undertaken. The results of the work are published as far as the problems are completed, in the bulletins and technical papers of the U. S. Bureau of Mines.



### SMELTER SMOKE DAMAGES.

Mr. Justice Middleton in his recent judgment on the smelter smoke cases said in part:

"Smelter smoke may, no doubt, be a nuisance, and in addition to being disagreeable it may cause injury to vegetation and in some circumstances I have no doubt an injunction ought to be granted. For reasons which will appear later I am of opinion that the mines cannot be operated without the production of smoke from the roast yards and smelters which contains very large quantities of sulphur dioxide.

"In each case it ultimately becomes a question of degree and in a much modified sense a question of the greatest good to the greatest number. I do not mean by this as I shall show that for the mere purpose of producing metal of value the owner of a mine may sacrifice his neighbors, but I think there are circumstances in which it is impossible for the individual to so assert his individual rights as to inflict a substantial injury upon the whole community.

"The individual right must be tenderly considered, but if pressed too far, if the courts are found impotent, the Legislature must intervene and the right of eminent domain must be asserted for the weal of the community as a whole.

"Until minerals were found, this whole country remained a wilderness but when mines were opened up towns and villages sprang up round the mines and farms began to be cultivated to supply the needs of the community.

"If the mines should be prevented from operating the community could not exist at all—once close the mines the mining community would be at an end and farming would not long continue. Any capable farmer would find farms easier to operate and nearer general markets if the local market ceased.

"It is the consideration of this situation that induced the plaintiffs' counsel to abandon the claim originally made for an injunction.

"All this appealed to me, but there is also a further consideration that seemed to me even more important. Nickel is essential for many of the world's greatest industries; the metal is only found in a few places; it cannot be mined and placed upon the market without producing a nuisance affecting at most a comparatively small area. Those going into that area to farm have (in almost all cases) gone there with their eyes open, seeking to avail themselves of a market in which abnormally high prices rule because of the demands created by those mines and their great distance from ordinary sources of supply.

"Some cases of hardship may exist, but according to the statement of counsel the mining companies have always stood ready to purchase the holdings of any individual at a price far in excess of the value.

"In my view the court ought not to destroy the mining industry even if a few farms are damaged or destroyed but in all such cases compensation liberally estimated ought to be awarded.

"Although the mines have been in operation for many years this is the first time in which actions have come to trial. The explanation given is that some arrangement for compensation has heretofore been made, but now claims have been made and adjustment seems impossible and the courts have been resorted to and much evidence has been given with the view of having it ascertained

how far the mines are answerable for the crop failures. The company sets up that many of the things complained of are not the result of the smoke but are to be attributed entirely to other causes, and that the claims are grossly exaggerated.

"Much time and money has been expended in preparing for the defence of these actions and I have had throughout to be on my guard lest the plaintiffs should be found waging an unequal warfare, but the plaintiffs represent a large constituency and their case has been well looked after. The admission by the defendants of certain evidence has saved the expense incident to expert evidence and has brought before the court the result of proceedings in other jurisdictions where similar situations have been faced.

"The suggestion has been made that there should be some attempt to utilize this sulphur dioxide. The only use to which it can be put is the manufacture of sulphuric acid. According to Professor Guess the output at the Canadian Copper Co. roast heaps would produce 2,500 tons of acid a day. The amount used in Canada is only 150 tons a day and the world's consumption, which has greatly increased since the war, is now estimated at 10,000 tons a day.

"Sulphuric acid cannot easily be stored or transported, it can only be handled in glass carboys; so the production at this enormous rate would create a much greater nuisance and source of danger than the sulphur dioxide.

"Quite apart from this aspect of the matter the commercial manufacture of sulphuric acid from the gas discharged from the roast beds is impossible and for the Sudbury ore, according to the evidence of Professor Guess, which I accept in its entirety, it is not practicable to abandon the open air roast.

### Exaggeration of Claims.

"There was as I have indicated a not unnatural inclination upon the part of the farmers near the mines and roast beds to attribute all their misfortunes to them. There was also an inclination to exaggerate the possibilities of farming in the north country; but I regret to say this was clearly an endeavor in many instances to so exaggerate the claims put forward that not even the greatest charity and one might almost say the greatest credulity can acquit the claimants of positive dishonesty. This dishonesty was not confined to the parties merely but extended to many of the witnesses. I do not mean to include in this all the parties nor all the witnesses, but the presence of so much gross exaggeration has made the task of assessing damages particularly difficult.

"One case will serve as an illustration, that of Ostroski and his wife. These people have only been in the country a short time and have no real knowledge of farming under the conditions to be faced near Sudbury. They run a boarding house for men working in the mines.

"The land purchased was 360 acres, the price being \$650; \$150 being represented by a mortgage; \$500, the entire balance, being secured by a second mortgage—no money being paid. All this land was rock save at one place, a small valley with steep rocky banks through which a stream made its way. Part of this valley was beaver meadow. None of it well drained as the stream was blocked by a natural dam of rock. This valley was said to contain 25 acres. Survey shows it

to be less than half—just 12 acres. The plan shows this drawn out in a narrow and most irregular manner along the banks of the creek.

"This was cultivated, in a way, for the two years, 1915 and 1916. The man was most poorly equipped in every way. The claim for loss for the injury done by smoke to this 12 acres in 1915 was over \$2,500 and for 1916 \$2,727.59. I do not mean by this the lump claim which is sometimes made in pleading, but the claim as sworn to.

"Take another example. Black makes claim as a market gardener. His places were small, ill-adapted for the purpose and poorly cultivated with quite inadequate assistance. All the circumstances—climatic, seasonal, etc., were against him. Yet he estimates his production at a sum on the average  $4\frac{1}{2}$  times as great as Dilworth, an experienced and reliable gardener, says can be produced on the best ground under the most favorable conditions.

"On paper it is easy enough to show that beets and turnips should yield \$1,800 per acre, but they never do.

"Mr. Copping figures out in a conservative way in the spring that his cash income from his place would be \$3,000. It came to \$275.00.

"Experienced farmers say that they expect from \$10 to \$20 per acre from their farms and do well to get \$100 per acre from market gardens year in and year out.

"All these things must be kept in mind.

"Some of the farmers who came before me appeared to do little if any more than make a fair living for themselves and their families and such of them as were questioned upon this so said. I am now speaking of those who appeared to be successful and who were not complaining of damaged crops.

"No man with a few acres of this rough land ever made the incomes these claimants ask for damages.

"All these and other considerations have had to be kept in mind in assessing damages.

"After much consideration I have come to the conclusion to make my awards as best I can without giving any details of computation, thinking this on the whole fairest and best.

"From the beginning the plaintiffs have assumed in many instances that it is enough to say 'I planted so many potatoes. The yield should have been so much—the smoke came, did some damage. All I harvested was so much.' And then ask me to assume that the difference represents loss caused by sulphur. The evidence that the sulphur smoke caused the loss is lamentably weak.

"The principles are I think indicated by what I have said and no good purpose would be served by any attempt to revise evidence as applied to any particular crop or to the particular cases.

"In all circumstances I make the following award which, while no doubt disappointing to the plaintiffs are intended to be as generous as the evidence warrants.

To Black, \$1,000; to Taillifer, \$800; to the Sudbury Dairy Co., \$1,000; to Belanger, \$750; to Clary, \$1,000; to Ostroski, \$500.

"In view of the fact that these are test cases I have concluded to award costs in each case, but as there was so much exaggeration in the claims presented I shall do the amount when bills are presented, reducing them somewhat from what would be allowed upon a taxation under a general award of costs."

## DIVIDENDS FROM NORTHERN ONTARIO GOLD AND SILVER MINES.

(From "The Northern Miner.")

Dividends paid by companies in the District of Temiskaming in 1917, to June 30th:

Cobalt .....	\$2,923,624
Porcupine .....	1,519,029
Kirkland Lake .....	65,187
	<hr/>
	\$4,507,841

Dividends paid to June 30th, 1917:

Cobalt .....	\$70,242,487
Porcupine .....	10,687,029
Kirkland Lake .....	391,125
	<hr/>
	\$81,320,642

### Dividends Paid by Cobalt Silver Mines to June 30, 1917:

Mining Company.	Amount of Dividends and Bonuses Paid During 1917 to June 30.	Total Amount of Dividends Paid to June 30, 1917.
Aladdin Cobalt .....	50,000	50,000
Beaver .....	.....	650,000
Buffalo .....	.....	2,787,000
Caribon Cobalt .....	.....	.....
(Drummond) .....	.....	225,000
Casey Cobalt .....	.....	203,249
City of Cobalt .....	.....	139,321
Cobalt Central .....	.....	192,845
Cobalt Lake .....	.....	465,000
Cobalt Silver Queen .....	.....	315,000
Cobalt Townsite .....	.....	966,726
Coniagas .....	200,000	8,640,000
Crown Reserve .....	88,110	6,190,840
Foster .....	.....	45,774
Hudson Bay T.&I.B. .....	.....	1,940,250
Kerr Lake (Holding Co.) .....	300,000	6,870,000
LaRose (Holding Co.) .....	149,862	7,011,571
Mining Corporation .....	900,000	2,248,750
McKinley Darragh Sav. .....	134,861	5,011,335
Nipissing Mines Co. (Holding Co.) .....	90,000	16,240,000
Peterson Lake .....	12,031	462,350
Right of Way Mines .....	8,427	241,392
Right of Way Mining Co. .....	.....	321,643
Seneca Superior .....	.....	1,579,817
Trethewey .....	.....	1,111,998
Timiskaming .....	150,000	1,834,156
Wetlaufer .....	.....	637,465
Private Corporations .....	.....	3,825,000
	<hr/>	<hr/>
	\$2,923,624	\$70,242,487

### Dividends Paid by Porcupine Gold Mines to June 30, 1917.

Dome Mines .....	\$300,000	1,500,000
Hollinger Consolidated .....	738,000	8,031,000
McIntyre Porcupine .....	361,029	361,029
Porcupine Crown Mines .....	120,000	780,000
Rea Mines .....	.....	12,000
	<hr/>	<hr/>
	\$1,519,029	\$10,687,029

### Dividends Paid by Kirkland Lake Gold Mines to June 30, 1917.

Tough Oaker Gold Mines .....	\$65,187	\$391,125
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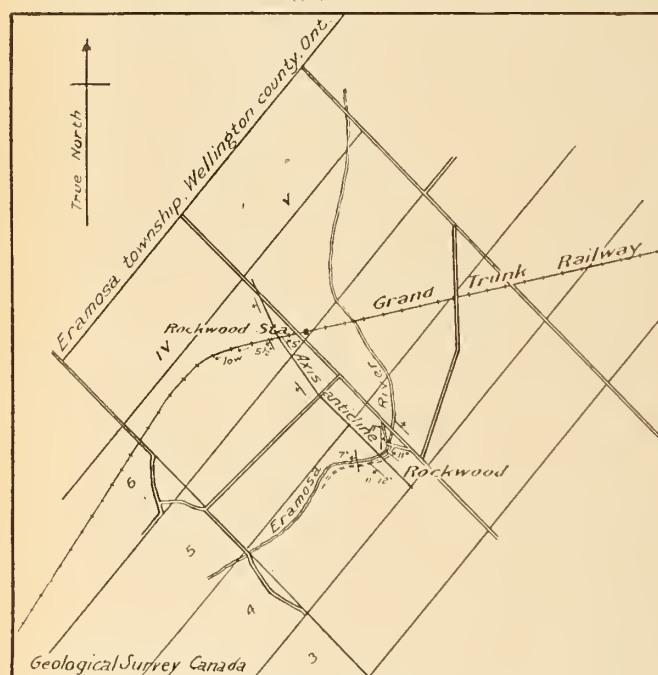


### THE ROCKWOOD ANTICLINE.

In connection with the occurrence of oil and gas in Ontario mention was made in the 1863 Report of the Geological Survey of the presence of an anticlinal structure in the rocks in the neighborhood of Rockwood. In a Memoir published in 1915, "Oil and Gas in Ontario and Quebec," by W. Malcolm, the attention of the public was again directed to the Anticline. Recently, a disposition to test the anticline has been shown and the Geological Survey has had a further examination made by Dr. M. Y. Williams and has received from him the following preliminary report.

The rock outcropping at Rockwood village is the Lockport formation, commonly known as the Niagara limestone (dolomite). The Eramosa beds, which are at the top of the formation, occur along the small branch of the Eramosa river west from the railway station and south of the tracks. The base of the overlying Guelph formation is represented by a small outcrop overlying the Eramosa beds at the edge of the small tributary valley about 400 yards west of the station.

The surface rock, except in the quarries, is much broken up by frost action and weathering; but the deeper beds are thick and firm. To the west of the main street of the village, quarries have been worked



Sketch map of Rockwood and vicinity,  
to show anticline at top of Niagara.

Approximate scale of miles  
0 1 2 3

M. Y. Williams, 1917.

for lime for some years and at these quarries and also in the stream valleys and in the railway cut west of the station good rock exposures occur.

The main rock structure is very clear. A well defined anticline extends through the western part of the village. The crest of the anticline crosses the river about 200 yards southwest of the bridge on the road between Concessions IV. and V., west of the quarries, and extends through the Agricultural grounds, the west side of the school yard, through the middle of the rock cut on the railway about 235 yards west of the station, and crosses the concession road near the north side of lot 6. Immediately to the north and south of Rockwood a thick mantle of surface material covers the rock.

On the crest of the Rockwood Anticline, for a width of about 100 yards, the dips are 5 deg. or less to the east

and west. Further away from the crest the dips are about 10-11 deg., on the east and somewhat lower on the west. To the east the dip of the strata may be clearly seen 300 yards from the crest of the anticline in the exposures east of the bridge in Rockwood, and to the west the dip is clearly shown although undulatory, as far as the Guelph outcrop mentioned above. Allowing for the thickness of the Eramosa beds (about 40 to 50 feet) between the outcrop west of the station and the remnant of the Guelph rocks and for the difference in level of the outcrops, I have estimated that the westerly descent of the formation is about 70 ft. in 1,200 ft. or about 300 ft. in a mile. As the average dip of the formation to the west is about 20-30 feet per mile it is clear that the anticline is well marked.

This fold in the Niagara rocks was mentioned by Logan (G.S.C. 1863 report, p. 330) and more recently by Malcolm. Its importance to the prospector for oil or gas does not, however, appear to have been appreciated. Recent successful practice in both the oil and gas industries has been to bore on anticlinal structures, and it has been found in the Ohio field that surface structures extend downward for long distances. The recent work done by me in the Milton area shows that the structure at the top of the Trenton continues upward to the base of the red Queenston shale or a distance of about 1,500 feet. Whether or not the structure still continues upward into the Silurian (Niagara, etc.), is yet to be proved.

### Possible Gas and Oil Horizons.

Two possible gas and oil horizons lie below the Rockwood anticline. These are the lower sandstones and sandy shales and dolomites of the Medina (upper or white Medina, or Cataract) with the whirlpool sandstone at the base, which produce most of the gas of the Niagara peninsula and some oil near Brantford, and the Trenton limestone which produces some gas and is known to contain a little oil at Milton. The new 3,000.-000 ft. Dover well of the Union Gas Company, in Kent county, is in the Trenton. Although the Trenton has been a great producer of oil and gas in Ohio, so far it has not been very successfully exploited in Ontario. Comparatively few wells, however, have so far been sunk into it, and drilling has been done for the most part without regard to structure.

At Crewson's Corners, about 3 miles east of Rockwood, the sandy portion of the Medina was struck 25 feet below the base of the Niagara and was found to be 85 feet thick. At that locality the Niagara is 145 feet thick. At Rockwood it is probably somewhat thicker, possibly 200 feet thick. No gas is reported from the well at Crewson's Corners. On lot 6, con. V., Pilkington Tp., about 16 miles northwesterly from Rockwood the top of the Trenton is 1,115 feet below the base of the Niagara.

From the above information a fairly close estimate can be made of the depth at which the gas and oil horizons will be penetrated by the drill.

The anticline at Rockwood is the best defined of any known to the writer in southwestern Ontario, and affords a favorable location for prospecting for oil or gas.

Two other well marked anticlines separated by a syncline occur near the middle of the northeastern end of lot 12, con. 111, Nassagaweya Tp., Halton county. The direction of these folds is about North 25 deg. west and the dips on the sides of the anticlines are from 12 to 14 deg. toward the syncline. The crests are about 220 yards apart. The sides of the anticlines away from the syncline are covered by drift.

### I. W. W. ACTIVITIES.

Seranton, Pa., July 4.—With the arrest today of Joseph Graber, an organizer of the Industrial Workers of the World, charged with being a spy in the employ of the German Government, Federal authorities declared their investigation had satisfied them that recent strikes and agitations of the I. W. W. in the anthracite coal regions had been stirred up by German agents with the hope of lessening the power of the United States in the war by decreasing coal production. Graber, who was taken into custody by United States Marshal James S. Magee, was held without bail under the Alien Enemy Act.

The above despatch indicates that suspicion of the German source of I. W. W. activities is not ill-founded. The Boston News Bureau under date of June 29 says in part:

"These stirring times, when economic conditions are in a state of flux and when the statistical position of labor has been growing so strong not only numerically but in the urgency of demand for its service, apparently have appealed to the I. W. W. as inviting its typical activities. That organization, with its past disturbing record in times of peace, becomes a far greater social detriment in wartime, through its general workings even more than in its backfire against registration and the draft. And the appeal may be considered similar for those whom Senator Thomas terms 'individuals in employ of our enemies,' who no doubt find such tactics safer than bomb-plotting, and quite as effective.

"Anaconda has been tied up quite completely and the loss of over 1,000,000 pounds of copper daily from output will be seriously felt. There is basis for Butte belief that German money and German propaganda are back of the strike movement now rushing through the copper camps of the country.

"The districts most seriously affected include: Kennecott in Alaska, Anaconda and the remaining Butte camp, Anaconda's Tooele smelter in Utah, the Morenci district in Arizona. Agitators continue at work at other mines and smelters, one of their chief objects being to close down the Garfield smelter which handles the Utah Copper Co. concentrates as well as other custom material."

### THE UNITED STATES ENGINEERING COUNCIL.

On June 27th was held the first meeting of the Engineering Council. This body is a department of the United Engineering Society and has recently come into being as a medium of co-operation between the four American national engineering societies. The function of the Council may perhaps best be described by the following extract from the by-laws of the United Engineering Society: "The Council may speak authoritatively for all member societies on all public questions of a common interest or concern to engineers."

The Council is composed of twenty-four members, five being appointed by each of the four founder societies and four by the United Engineering Society.

At the organization meeting held in the rooms of the American Society of Mechanical Engineers on June 27th the following officers were elected: President, F. N. Hollis; vice-presidents, H. W. Buck and George F. Swan; Secretary, Calvert Townley. Executive Committee, the four officers named with J. Parker Chamberlain and D. S. Jacobs.

The Council discussed at length ways and means by which the founder societies through the Council may be of use to the nation. The unanimous desire to help the Government in the prosecution of this war resulted in a resolution instructing the Executive Committee to co-operate with the Government in procuring the services of engineers, also the appointment of a committee of three, consisting of Messrs. H. W. Buck, A. M. Greene, Jr., and Edmund B. Kirby, to consider the best means of utilizing the inventive ability of members of the founder societies.

The secretary was instructed to inform all Government Bureaus that might be interested in the organization of the Engineering Council and its desire to be of assistance.

### REOPENING OF COAL MINES.

A Canadian Press Despatch dated at Calgary, June 27, is as follows: The mines in District 18 and in the Red Deer Valley will reopen at once. An order to the operators to this effect was issued today by Commissioner W. H. Armstrong, who was appointed by the Dominion Government to investigate the situation and to take such action as might be deemed necessary in the public interest.

Mr. Armstrong has wide powers under the order in Council under which he is acting, and the operators have no recourse but to obey the mandate.

The mines probably will be in operation by Tuesday next, July 3.

The word has to be disseminated among the men, who are widely scattered as a consequence of the prolonged strike, and it will be impossible to get them together before that date.

The terms under which the mines will operate will be those enunciated by R. F. Green after his recent inquiry here. Mr. Green reported in favor of the operators eliminating the penalty clause, of them paying an increase of 7½ per cent. more than the tentative agreement, and of appointing a Commission to investigate the living cost and conditions every four months, at the request of either party.

These terms provide for an increase over the old agreement of about 22½ per cent., as the scale in the tentative agreement was about 15 per cent. above that of the old agreement. The penalty clause was to penalize the men if they violated the agreement. The Commission is supposed to adjust the wages on the basis of living cost, and may accordingly raise or lower the rate of pay.

About eight thousand men have been affected by the strike, and the majority have been idle since the 1st of April, and some for a longer period. The loss in wages amounts to hundreds of thousands of dollars, and the end has not come a moment too soon, for the coal stocks were getting low, smelters were closing down, and the railways were threatened with a shortage for the hauling of the 1917 grain.

### STEEL HARDENED CASTINGS.

The Stroh Steel Hardening Process Co. of Pittsburgh has issued an interesting bulletin on its products. The Stroh process is a method for casting the finest alloy steel together with ordinary soft steel in one solid piece. The resultant casting has a wear proof alloy steel structure on the wearing surfaces. A number of Stroh products are used in the mining industry, such as wheels, mill castings, crusher heads, crusher jaws, etc.



### CANADIAN COPPER AND INTERNATIONAL NICKEL REPORTS.

Some interesting information concerning the reports issued by the International Nickel Company was given before the Ontario Nickel Commission by A. D. Miles, president of the Canadian Copper Co. The following is from the evidence taken:

Q. There are one or two matters I do not understand here, and I am going to ask you to enlighten me. You are now operating your company, as far as the International is concerned, under this agreement of the 31st of March, 1909, of which you gave us a copy? Is this the latest? A. That is the latest. Prior to that time, there were minority shareholders in the Canadian Copper Company, and a complete set of books had to be carried and a report issued to these minority shareholders. Since that stock was acquired, it has not been necessary, except for the purposes of bookkeeping, so the contract has never been renewed, but has been in force ever since.

Q. Were there annual contracts before that, each of the same nature? A. I am not sure whether they were annual, they may have been for two or three years, but they were renewed at set times.

Q. Was there any variation from year to year in the price, 7c. for copper contents, and 10c. for nickel contents? A. Yes, it was varied once that I remember, and possibly oftener.

Chairman: I was under the impression that there had been no variation in that agreement? A. Oh, yes, from 1902 to 1909 there were changes.

Mr. Young: And there must have been a similar agreement before 1902, when the Canadian Copper Company and the Orford Company were at arm's length? A. When they were two separate companies, yes, but I don't know that they were available. That was before we had anything to do with the companies. The mine was owned by one group of men, and the refinery by another.

Q. Yes, but the Canadian Copper Company at that time had everything to do with it? A. Yes.

Q. So that if you could get that, it might be helpful as to the agreements between the Canadian Copper Company and the Orford Company prior to 1902? Have you any other inter-company agreements, the Canadian Copper Company with the International subsidiary companies, except this one? A. Yes, with the Huronian Company.

Q. Do you know whether there are inter-company agreements between other concerns? A. Not that I know of.

Q. You don't know about that? A. No.

Q. Now this balance sheet is interesting, could I trouble you to look it over for me. (The Canadian Copper Company balance sheet for the year ending 31st March, 1916, shown to Mr. Miles). You might tell us shortly how you make your balance sheet up here. You are operating with The International Nickel Company under the agreement of 1909? A. Yes.

Q. That agreement determines the price you get for your copper and nickel contents? A. Exactly.

Q. Then on that basis you deal with the International as if they were real purchasers? A. Yes.

Q. And this statement is the result, because you have no other purchasers; you don't sell to anyone else? A. No.

Q. And here are your assets,—property, \$9,174,000 odd. Now the assets of The International are \$44,000,000 odd. What makes up the difference generally? A. The New Caledonian mines, the refinery, the stock of

the Canadian Copper Company, the Huronian Company, the Upper Spanish Improvement Company, and all other subsidiary companies.

Q. Well, could these account for the difference? I am not asking in any spirit of hostility; I have a great zeal for facts? A. The value of these properties, plants and stocks account for the difference.

Q. It covers properties owned and operated. Now this statement of yours is presumably as correct as you could make it; that is, to the value of your assets in Ontario? A. Yes. There is no ore included, that is only the property.

Mr. Gibson: Does that not include the mines? A. It includes the mines as property, as real estate.

Q. Does it not take in the value of the mineral deposits? A. No, it does not.

Mr. Young: Then the current assets speak for themselves and are correct? A. Yes.

Q. Now the inventories in The International statement for the same year are \$4,000,000 and over, and your metals are only \$758,000. What does that inventory include? A. The inventory of The International Nickel Company includes supplies, metals in stock and metals in process. The inventory of the Canadian Copper Company includes supplies and metals in process only. Supplies \$772,000, metals \$758,000, total, \$1,530,000.

Q. The Canadian Copper Company would not include matte stock? A. No, it includes only metals in process; the matte is shipped as it accumulates.

Q. That would include all their supplies? A. Yes, the difference of \$2,470,000 is accounted for by supplies, finished products, matte in stock and metals in process.

Q. Then on your liability side you have noted The Huronian Company, that is not the capital stock is it? A. No, that is the amount the Canadian Copper Company owes the Huronian Company for power.

Q. That would be your charges for power? A. Yes, we operate the Huronian Company.

Q. Then, what is the liability to The International Nickel Company, of \$3,937,000? A. That is the balance, or the difference between the total and \$5,800,000 which was a dividend.

Q. And then there is another set of entries here that I would be glad to have explained. Take the item of depreciation, you write off \$1,611,182 for your depreciation. What does that cover? It is not mineral exhaustion? A. No, it covers plant depreciation.

Q. Then in the same year The International write off \$806,000; that must be for their plant? A. Yes.

Q. Do you know on what basis they are making that up, what percentage? A. Yes, a life of fifteen years.

Q. You might explain very shortly your depreciation basis, because it might help us in other aspects of our enquiry? A. The plant and buildings are depreciated on their estimated life. The life of some machinery is little over one year. Some of the buildings and more permanent equipment have a life of considerably over fifteen years. The average life, however, of all machinery and buildings is estimated at fifteen years.

Q. The depreciation, the Chairman points out, represents about 15 per cent. of your property? A. Yes, more than 15 per cent.

Q. Then the item of mineral exhaustion, \$1,236,521, is that an actual statement or an allowance? A. That is an estimate based on the tons of ore treated. It is the amount per ton of ore treated set aside to amortize the original cost of the property. It is an arbitrary figure.



Q. Now, The International Nickel Company wrote down \$900,827 for exhaustion of mineral. I don't understand that; where have they got any minerals? A. They own all of the stock of the Canadian Copper Company, and of Societe Miniere Caledonienne, and part of the Nickel Corporation, Limited. The Canadian Copper Company have accumulated a fund for mineral exhaustion of \$1,236,521.90, which is a reserve to March 31st, 1916, while The International Nickel Company reserved during the year ending March 31st, 1916, for mineral exhaustion, \$900,827.58.

Q. You might explain this entry of The International Nickel Company in current liabilities and its entry of payment to that Company, of \$5,800,000. A. The funds of the Canadian Copper Company accumulated, and the \$5,800,000 was a dividend paid by The Canadian Copper Company to its shareholders.

### THE PROPOSED IMPERIAL DEVELOPMENT BOARD.

London, Eng.—An interesting paper was read by Capt. Richard Jebb recently before the Royal Colonial Institute on the proposed Empire Development Board, than which, he said, nothing had excited more attention in the report of the Dominions Royal Commission. Capt. Jebb was also of opinion that the resolutions of the Imperial War Conference, recently published, and Mr. Lloyd George's speech at the Guildhall on 27th April encouraged the hope that effect may be given to the proposal as soon as possible after the war. The lecturer summarized the proposals of the Royal Commissioners as follows:—

(a) To continue, complete and thereafter keep up to date the survey begun by us (the Royal Commissioners) of the relation between the production and requirements of the Empire in the matter of food supplies, raw materials and all other commodities essential to its well-being; (b) to watch and report upon the changing requirements of the Empire in respect of such materials and commodities, and to mature plans for promoting and improving their production within the Empire; (c) to investigate in collaboration with existing institutions and committees for scientific research—(1) the possibilities of production within the Empire of such of these essential materials and commodities as now are, or may in the future be found to be, mainly produced and controlled outside its limits, as well as the possibilities of new supplies generally; (2) the best means of promoting efficiency and preventing waste in existing methods of production; (3) the possibilities of the utilization of substitutes for essential commodities which are not found to be available within the Empire; (d) to consider and devise means for the direction of Empire capital towards the development of Empire resources; (e) to study the larger aspects of migration within the Empire with a view to securing and maintaining a sufficiency of population in all its parts; (f) to advise on the adequacy for Imperial requirements of schemes of harbor improvement in certain of the great ports within the Empire; (g) to study lines of communication by steamship, cable or railway which are contributory and necessary to Imperial development; (h) to study and report upon legislation affecting the mechanism of trade in its widest sense, and to keep in touch with development in similar legislation throughout the world; (i) to prepare and publish Imperial statistics.

At the conclusion of his lecture Capt. Jebb said:—“I feel that all of us should unite in urging that the

establishment of an Empire Development Board on the lines proposed by the Royal Commission should be the very first business of the Imperial Conference which is to be convened after the war.”—Financial Times.

### IMPERIAL MINERAL RESOURCES BUREAU.

London, Eng.—By direction of the War Cabinet, Dr. Addison, the Minister of Munitions, has made arrangements for the appointment of an Inter-Departmental Committee to prepare a scheme for the establishment in London of an Imperial Mineral Resources Bureau (a) to collect information in regard to the mineral resources and metal requirements of the Empire, and (b) to advise what action, if any, may appear desirable to enable such resources to be developed and made available to meet requirements. The committee consists of the following:—Sir James Stevenson, Bart. (Chairman), Mr. C. L. Budd, Sir A. Duckham, K.C.B., Prof. W. R. Dunstan, C.M.G., Mr. C. W. Fielding, Mr. J. F. N. Green, the Right Hon. Lord Islington, G.C.M.G., Mr. L. J. Kershaw, C.I.E., Sir Thomas Mackenzie, Sir George Perley, K.C.M.G., Mr. W. S. Robinson and the Right Hon. W. P. Schreiner, K.C. The Secretary to the Committee is Mr. Oswald C. Allen, and all communications on the subject should be addressed to him at the Ministry of Munitions, Whitehall-place, S.W.1.

The appointment of the above Committee follows on the appended resolution passed by the Imperial War Conference:—

“That it is desirable to establish in London an Imperial Mineral Resources Bureau, upon which should be represented Great Britain, the Dominions, India, and other parts of the Empire. The Bureau should be charged with the duties of collection of information from the appropriate Departments of the Governments concerned and other sources regarding the mineral resources and the metal requirements of the Empire, and of advising from time to time what action, if any, may appear desirable to enable such resources to be developed and made available to meet the metal requirements of the Empire. That the Conference recommends that His Majesty's Government should, while having due regard to existing institutions, take immediate action for the purpose of establishing such a Bureau, and should as soon as possible submit a scheme for the consideration of the other Governments summoned to the Conference.”—Financial Times.

### IN SOUTHERN YUKON.

The Weekly Star, published at Whitehorse, Yukon Territory, said on June 8: Messrs. Madongul and Gaunt, two of the four lessees of the Fleming group of claims at Conrad, Southern Yukon, were in Whitehorse early in June and while there purchased a supply of sacks which they took back with them to use in the shipment of about two carloads of ore they have taken out since commencing work several weeks ago. Both were much elated over the prospects of the Fleming mine, an extension of the Venus, from which latter mine a lot of high-grade gold-silver ore is now being taken out by Supt. MacFarland, some of which runs as high as \$1,000 per ton.

From Mr. Gaunt it was learned that the people working the Venus mine now have 1,800 tons of high-grade ore on the dump which they intend shipping to the coast as soon as navigation shall open. The low-grade ore will be concentrated by the old flotation plant which has just been put in at the Venus mine and which is now being tried out in a working test.



### MR. HOOVER'S APPOINTMENT.

The Board of Directors of the American Institute of Mining Engineers at a recent meeting passed the following minute regarding the appointment of Herbert C. Hoover as Food Controller of the United States:

This Board has learned with pleasure that the President has nominated Herbert C. Hoover as Food Controller of the United States.

Mr. Hoover has been for 21 years a member (for 2 years a Vice-President), and is at the present time an Honorary Member, of this Institute, and his professional career is well known to American and foreign engineers. His field work on State and Federal geological surveys; his management of important mining and engineering enterprises in the United States and Australasia, and in China as Chief Engineer of the Imperial Bureau of Mines; his courageous and skilful leadership of a continuous battle of 39 days, and his subsequent organization and conduct of the defence of Tientsin, besieged by the Boxer forces; his directorship, on his own responsibility, or as a member of the firm of Bewick, Moreing & Co., of gigantic works of engineering and transportation in almost every part of the world; has marked him, before the beginning of the present war, as one of the most efficient, resourceful and successful administrative engineers of his generation.

These qualities were strikingly exhibited when, at the outbreak of the war, Mr. Hoover organized in London a volunteer committee of American mining engineers, which supplied the immediate needs and returned in safety to this country 100,000 frightened and helpless American refugees. It has been asserted that this great achievement was due to the support of the U. S. Government. But that Committee expended in its work \$300,000 of the money of its members and their friends, and commanded the support of the Government by its conspicuous success.

In like manner, that wonderful achievement, in an emergency which found all governmental agencies inadequate and unprepared, led to the selection of Mr. Hoover as Head of the Belgian Relief Commission, which had expended more than a hundred million dollars with unexampled economy, honesty and efficiency, retaining the confidence of both belligerent parties.

In view of the foregoing record, and of its own knowledge of Mr. Hoover's personal character and methods, this Board unhesitatingly declares its opinion that he is the man best qualified to meet the emergency which has suggested the action of the President, and earnestly recommends to the Congress of the United States the approval of that action by appropriate legislation, and to the Senate of the United States the ratification of Mr. Hoover's appointment as Food Controller.

### MOLYBDENITE AT WILBERFORCE, ONTARIO.

A company, known as the Dominion Molybdenite Limited, has been formed by Toronto men to operate a molybdenite deposit at Wilberforce, Ont. The organizers, J. J. Gray, W. J. L. MacKay and P. J. Dwyer together with Dr. Lowrey, control the stock. Mr. Dwyer sends us from the property the following information:

"The molybdenite discovery made at Wilberforce last winter has developed into a proven orebody of large dimensions. The owners have received such good reports from different mining engineers and experts, that they have decided to erect a mill."

### THE APPLICATION OF THE FLOTATION PROCESS.

The concentration of sulphide ores, particularly low-grade ores, carrying gold, silver, copper, lead, zinc, and other metals, seems to be undergoing a revolution. Except for ores that could be smelted directly, or for gold and silver ores that could be treated by stamp milling, with or without cyaniding or chloridizing, the generally accepted plan of concentrating sulphide ores has been concentration by gravity, involving the use of jigs, buddles, vanners, or tables. Within the past 15 years, however, metallurgists throughout the world have come to recognize the enormous possibilities of concentration methods based on entirely different principles—the surface tension of liquids and the adhesion of liquid films to the surfaces of minerals. These principles are used in what are known as flotation processes. Ingalls has aptly characterized flotation as concentration upside down, because usually the heavier ore mineral rises, while the lighter gangue mineral sinks.

For convenience, flotation may be defined as the process or processes by which the valuable minerals in a mass of finely ground ore are caused to float on a liquid into which the finely ground ore is fed. Flotation processes can be grouped as of two types—film flotation and froth flotation. In film flotation the floating mineral particles are sustained on the surface film of the liquid. In froth flotation the minerals floated gather in and on the surfaces of bubbles of air or gas driven into or generated within the liquid. As the surface of a mass of bubbles overlying a liquid is greater than that of the upper surface of the liquid itself, a froth will carry a greater burden per square foot of area of liquid than will the film surface of the liquid.

In the application of flotation there is opportunity for endless variety of detail. Thus, in froth flotation the bubbles may be produced by beating air into the pulp or ore-carrying liquid, by forcing air through it, by generating a gas through the action of acids in the liquid on some constituent of the ore, or by applying reduced pressure to the surface of a pulp saturated with air.

The great field of flotation has been the preventing of slime losses at ordinary concentrating mills for ores containing valuable sulphides or native metals. Also, flotation is particularly adapted for the treatment of an ore carrying valuable minerals in very small grains. As regards gold and silver ores ordinarily treated by cyanidation: Some can be profitably treated by flotation, and from some it is possible to recover gold and silver that can not be profitably recovered by the cyanide process. However, it is hardly probable that flotation will completely displace the cyanide process for gold and silver ore, or leaching processes for copper ore, because the latter produce metal for shipment, whereas flotation ordinarily yields only high-grade concentrates for shipment to smelters.

So rapidly is the art of flotation advancing that any complete treatise on the subject is likely to be out of date by the time it is printed. However, as the U. S. Bureau of Mines is continually receiving inquiries regarding a number of more or less practical questions that are seemingly not answered with sufficient clearness



in the existing literature, attempt is made in a bulletin just published to answer such questions as are more pertinent and important. Answers to some of the questions are to be found in the literature of flotation, but the majority, possibly because they are decidedly practical, seem to have been overlooked or left unanswered. The discussion in the bulletin, technical paper 149, by D. Ralston does not attempt to cover the theories put forth to account for the facts accumulated by the many experiments with flotation, nor does it attempt to describe in detail flotation plants nor the procedure in different mills. Rather it seeks to answer questions that are apt to be asked by persons who wish to know the possibility of successfully applying flotation to a given ore or mixture of ores.

### INCREASED WAGES FOR MINERS.

Timmins, July 4.—The labor situation in the Porcupine is gradually clearing up, and all danger of further serious difficulty is now believed to be removed. The biggest mines in the camp have made wage increases that seem to meet the needs and generally satisfy the men. The McIntyre and Dome as noted last week gave a straight raise of 50c per day, and the Porcupine Crown and V.N.T. expected to make arrangements satisfactory to all concerned. Since then the Hollinger has talked the wage question over with some of its employees and on Saturday notices were posted informing employees that the minimum wage for underground would henceforth be \$4.00 per day. The Hollinger's chief need at present is for "muckers," and at \$4 per day it is not likely that there will be any difficulty in securing a full staff. Of course, some of the machine men do not like the new arrangement as it is intended to dispense with their helpers, leaving them to do their work without the assistants. However, as many of the machine men are now working under contracts, and so are not affected by the change, no difficulty is expected on this score. Also, it may be noted that in other camps machine helpers are not usually supplied, nor do the men under contract employ them.

The Hollinger underground minimum wage includes "muckers" at \$4.00 per day, though this is 50c per day more than asked for this class of labor by the Union schedule. The Hollinger, however, felt that if machine men could not live on less than \$4.00 per day, the high cost of living would press equally hard on the "muckers," so the general rate of \$4.00 was made.

In making the new rates, none of the mines considered the recognition of the Union, dealing only with their own employees. The Union on its part did not press "recognition" at this time. As in the case of some of the other mines, bonuses were also dropped under the new scale by the Hollinger.

The effect of the Hollinger announcement on Saturday was to give a renewed cheerfulness and active hopefulness to the camp. Several business men ventured the opinion that they could already see the good effect on business through the public confidence that all difficulties were near an ending, and that renewed and increased activity was coming to the camp.—Porcupine Advance.

### CANADA COPPER CORPORATION.

In addition to its British Columbia Copper Co. operations in the Boundary district of British Columbia, the Canada Copper Corporation has for several years been developing another copper property, situated on Copper Mountain, within a dozen miles of Princeton, Similkameen district. The company in 1916 spent \$396,000 on the further development of this Copper Mountain property and on the purchase of several neighboring claims, under bond. The company's annual report, issued lately, gives some particulars of the work done last year to confirm results indicated by diamond-drilling previously done. This work was mainly in the nature of underground development, which may also be utilized for the permanent operation of this property. To expedite doing this underground work, a power transmission line 13.6 miles in length was constructed to Copper Mountain from East Princeton, where there is a power plant at inoperative cement works, a lease of which power plant had been secured by the Canada Copper Corporation.

On the Copper Mountain property, a tunnel, 9 by 9 ft. in the clear, was driven a distance of 2,100 ft. on the 3,950 ft. level, and numerous raises and lateral drifts were made, the total length of this work being 5,206 ft. As soon as it became apparent that the results secured from diamond drilling were reliable, drilling from the surface was resumed, and 8,007 ft. of diamond-drilling was done in 1916. In addition, trenches to a total length of 2,364 ft. were opened on newly located mineral claims. No material increase in ore reserves is reported for the period under review, because the underground work was done especially to check the accuracy of the previous diamond-drilling operations. Underground diamond-drilling is now being done from faces opened last year, and it is reported that new ore is being encountered.

Prior to the execution of the underground development campaign, it was deemed expedient to class the ore as "reasonably assured" and "probable" ore. It is now estimated that there is 10,000,000 tons of definitely assured ore and 2,000,000 tons of probable ore. The average grade of this ore is 1.74 per cent. copper (or nearly 35 lb. to the ton of ore) and 20c. a ton of recoverable gold and silver. The ore thus far developed is well above the level of Similkameen river. It is of primary nature and while likely to extend below the level of the river, operations for many years to come will be confined to areas above the river, and extraction of the ore will be by means of tunnels. Approximately one-half the ore thus far developed will be extracted by means of open cut mining.

At the beginning of 1916 a 50-ton experimental flotation mill was placed in operation for the purpose of outlining definitely the metallurgic procedure to be adopted in a large mill. The opinion of the company's own engineers regarding the geologic features is said to have been confirmed by an independent report on the properties made by Mr. Sydney H. Bell. Mr. Allen Hastings Rogers, who also made an independent report on the property, confirms the company's estimates of quantities of ore and its value. His conclusion was that the property is sufficiently developed to warrant the erection of a mill to have a capacity of 3,000 tons a day. The cost of producing copper was estimated at 2.57c. per pound based on existing uniting rates.



**OBITUARY.****Dr. Robert Bell.**

Dr. Robert Bell, a geologist and explorer who for many years was in the employ of the Canadian Geological Survey and was for some years Acting Director of the Survey, died recently at Rathwell, Manitoba.

Dr. Bell did much useful pioneer work in Canada, particularly in exploring the hinterland. He will be long remembered for his contributions to the geology and geography of Canada.

Dr. Bell was born in Toronto in 1841. He joined the Canadian geological survey as an assistant in 1856. From 1858 to 1861 he studied engineering and surveying in McGill university, receiving the degree of M.D. and C.M., having included medicine and surgery in his studies. He was medical officer, naturalist and geologist of the Neptune expedition in 1884, and of the Alert expedition in 1885 to Hudson strait and bay. He was geologist of the Diana expedition in 1897 when he surveyed the south coast of Baffin land. He was royal commissioner on the mineral resources of Ontario in 1888. Dr. Bell traversed so many unknown spots that he became known as the principal place-name father of Canada. He is said to have seen more game, fish, wild Indians and Eskimos than any other man. He collected much folklore. He won geographical distinction in regard to the Athabasca, Slave, Churchill, Nelson, Hayes, Winnipeg and Albany rivers. Dr. Bell was one of the founders of the Royal Society of Canada.

**M. C. M. CLEARING FOR ACTION.**

Houghton, July 5.—The Michigan College of Mines campus became an army training camp yesterday. The officers of the Michigan battalion of engineers were ordered to duty and the college, to all intents and purposes has become a training place for soldiers.

The engineers are ready for their camp and are awaiting their tentage from the state. The officers have laid out the campus for the purpose of the camp and the plans involve the removal of most of the trees on the grounds. The tents will be located west of the mechanical building, which is midway of the campus, and the drill ground will be east of that building. The college has set aside the old assay laboratory near the mechanical engineering building as the battalion mess hall.

**BULLETIN ON AIR COMPRESSORS.**

Bulletin K-302, illustrating a line of steam driven, straight line, single stage air compressors manufactured by the Canadian Ingersoll-Rand Co., Limited, of Montreal, has been received. The type of machine described is designed to cover the field of those requiring compact, self-contained units of small and medium size for service in shop, foundry, mill or electrical plant, etc. Automatic splash lubrication, dust-proof construction, "Circo" silent leaf valves and quick convertibility to belt drive are among the leading features of the design dwelt upon in this publication.

**DOMINION STEEL.**

"We are booked up in steel products to the end of the calendar year," President Workman told the shareholders of Dominion Steel Corporation at the annual meeting held at Montreal last month, "and in addition to that our shell steel output for the first six months of 1918 has been disposed of."

**PERSONAL AND GENERAL.**

Mr. Thomas Kiddie, for a number of years a well known metallurgist in the Coast district of British Columbia, but latterly residing in Southern California, is on a visit to Vancouver, B. C.

Mr. John Hopp has gone to Barkerville, Cariboo district, B. C., to his several hydraulic placer-gold mines in that region, after having spent the winter on the Coast. It is reported from Barkerville that partial clean-ups on several of the hydraulic properties have been very satisfactory thus far this season, which is not yet half over.

Mr. D. Kerr, manager for the Northern Manitoba Mining and Milling Co., which had previously shipped some ore from the Le Pas district for a bulk test, was at Trail, B. C., last month.

Mr. James Cronin, for years manager of the St. Eugene mine in East Kootenay district of British Columbia, when that mine was the biggest producer of lead in Canada, has returned to the Babine country, in Omineca mining division, to continue mining on the group of mineral claims he has been developing there for several years.

Dr. A. P. Coleman, Professor of Geology in the University of Toronto is in South America studying glacial phenomena.

Mr. C. W. Brown succeeds Mr. T. R. Stockett as manager of the Western Fuel Co.

Mr. E. L. Bruce will continue this summer the geological mapping of mineral areas north of the Pas, Manitoba.

Mr. H. C. Cooke, of the Geological Survey, is to make a map of the Fort Matachewan area this summer.

Mr. A. G. Burrows of the Ontario Bureau is examining gold deposits in Powell township.

Mr. Geo. R. Rogers has opened an office at 905 Traders Bank Bldg. Toronto.

Mr. Samuel Seaver and Mr. E. J. Albert of Toronto have been elected members of the Canadian Mining Institute.

Mr. N. B. Davis, economic geologist, Kingston, is entering the consulting field. He specializes in the non-metallic minerals.

**BARYTES AND LITHOPONE.**

Barytes (barite or barium sulphate) is used chiefly in making mixed paints, in which white, ground, and water-floated barite is employed as a pigment. Ground barite is also used in the rubber industry and to some extent by the makers of heavy glazed paper and ink. Lithopone, a chemically prepared white pigment consisting of about 70 per cent. barium sulphate and 30 per cent. zinc sulphide, is one of the chief constituents of the "flat" wall paints so extensively used in office buildings and hospitals, replacing the less desirable paper and calcimine wall finishes.

Since the beginning of the war a barium chemical industry has been established in the United States to supply barium carbonate, nitrate, chloride, chlorate, hydrate, and binoxide, which were formerly imported largely from Germany. In 1915 this industry consumed 10 per cent. of the output of domestic barite, but the consumption in 1916 was apparently somewhat larger. The barium chemicals have a wide variety of applications, perhaps the most important of which are the use of barium binoxide in the preparation of hydrogen peroxide, that of barium chloride as a water softener, and that of various salts in the manufacture of optical glass.

## SPECIAL CORRESPONDENCE

### NORTHERN ONTARIO.

#### Porcupine East Lake.

St. Louis financial interests are said to have taken an option on the Porcupine East Lake property. These claims are situated in the Township of Whitney, in the Porcupine district. When prospected a short time ago results obtained were considered very favorable. Diamond drilling will be commenced within a short time for the purpose of proving the properties at depth. A little free gold has been discovered in veins on the surface.

#### Dome.

The big main crosscut of the Dome Mines at the 700-foot level should encounter the large high-grade ore-body indicated by the diamond drills any day now. This body of ore is estimated to be approximately 120 feet in width and to carry values of around \$17 to the ton. Heretofore the Dome ore has averaged less than \$6 to the ton and the importance of the huge body of \$17 ore can hardly be appreciated by the layman. However by the middle of August this ore should be available for mill feed, and its effect on the mill heads and profits of the company will no doubt immediately be felt. With the completion of the crosscut through the orebody, stoping, drifting and winzing operations will be commenced at once and by the end of the current year this body will probably be developed sufficiently to allow of its estimate being included in the ore reserves, which should show a substantial increase both in values and tonnage. It has always been more or less difficult to estimate ore reserves at the Dome, owing to the extremely varied distribution of the values and the occurrence of the ore in large masses entirely without walls. The milling capacity of the Dome has been increased during the past year to 1,500 tons per day, and the mine equipment has been completed and put in operation, with the result that considerable reduction in the cost of handling may now ensue. The underground equipment of the mine is sufficient to produce at a capacity of 3,000 tons per day, so that any future demands on this portion of the plant will be readily met. At the 1,150 ft. depth another large ore-body averaging around \$10 to the ton has also been indicated, which is believed to be the downward continuation of the orebody at the 700-ft. level. Whether this proves to be the case or whether this is an entirely new orebody, it will prove of extreme importance to the future of the mine.

Recently the management of the mine increased the wages of their employees to meet the high cost of living, and there is said to be little likelihood of trouble arising from this source for some time to come. While handicapped to a certain extent by the scarcity of labor at the present time, it is said that this condition shows considerable improvement over a month ago, and gradually the number of men on the pay roll of the company is increasing.

#### McIntyre.

The face of the big main drive at the McIntyre Porcupine mines at the 1000 ft. level is now within a few feet of the Jupiter line and shows 32 feet of ore. At every level between the 400 and 1000 ft. development work is being prosecuted. This development work is being centralized in such a manner as to permit of the ore being dropped from the upper levels of the mine through passes to the 1000 ft. level where it will be deposited in cars and transported to the main shaft. About 350 men are employed underground at the pre-

sent time. With the completion of additions to the crushing equipment of the mill the capacity will be brought up to 600 tons per day. At present 500 tons per day is being treated at a cost of between 80 and 90 cents a ton for milling, which is a record for any Ontario gold mine. In spite of the fact that no effort is being made to regulate the grade of ore going to the mill, most of which is coming from development, the heads are being maintained at about \$10 to the ton. It is estimated that the ore blocked out in the mine averages around \$12.50 to the ton, and when the work becomes more centralized it is anticipated the heads will come nearer to this figure.

Recently the McIntyre gave their men an increase of approximately 50 cents a day in their wages and complete harmony is said to exist between the management and the men. The scarcity of labor has not curtailed production to any great extent at the McIntyre.

#### Hollinger.

The last report of the Hollinger mining company shows a big falling off in the production of the mine owing to the shortage of labor. At the present time about 800 men are on the pay-roll as compared with a desired number of 1,500. The costs per ton were given as \$4.66. When it is considered that Hollinger has frequently milled and mined its ore for a cost of \$3.62 per ton, it will be plainly seen that the labor shortage is cutting no small figure with the company. The average grade of ore treated also shows a considerable falling off. All construction on the new 1,000-ton unit for the mill has been suspended, owing to the fact that it would be impossible to supply it with ore to keep running under the present conditions. The old mill, however, is operating at a reduced rate. The central shaft on the property has been put into use recently and from the time this occurred the men and material have been taken up and down the old shafts while the ore from the mine is being hauled up the new central shaft. This new acquisition to the equipment of the mine has added greatly to the facility with which the handling of the ore is accomplished. According to a statement given out by Mr. N. A. Timmins, president of the company, the mine is in excellent shape, and the plant is operating under the most up-to-date conditions. It is also stated that the ore reserves have been added to considerably since the beginning of the present year. In fact, all that is affecting Hollinger at the present time is the shortage of labor. Recently a minimum wage of \$4.00 was authorized for underground workers, and the men employed at the mine are reported to be well satisfied with the conditions prevailing.

#### Schumacher.

Underground work at the Schumacher mine has been temporarily suspended, owing to the shortage of labor. Construction of the new 140-ton mill is proceeding very satisfactorily at the present time. Within the next six weeks the building will be ready for the installation of the machinery. Providing no delay is experienced in the delivery of the machinery it will not be long before the mill is again working on the higher grade of ore which has been encountered at the lower levels of the mine. In a general way the Schumacher mine is in better condition than ever before, and once operations are again in full swing it should not take long to reflect the improved condition of both the underground workings and the milling equipment which is being installed.



### Dome Extension.

Exploration work on the Dome Extension at Poreupine is still being carried on by the Dome Mines Co., which has an option on the stock of the former company. The work is being conducted in a drift at the 600-ft. level of the Dome Extension where a diamond drilling machine has been set up. The length of the drift from the main shaft of the Dome to where the drilling is going on is about 200 feet. It is the intention of the company to sink a hole 1,400 feet deep from the 600-ft. level. The sinking of this hole will help determine the prospects of finding ore at depth on the property, and the results will be watched with keen interest.

### Dome Lake.

Ore of a good grade is being opened up in a winze which has been sunk 80 feet from the 400-ft. level of the Dome Lake mine and drifting operations are now being carried on. At the point now reached the vein is carrying a good grade of milling ore and is the full width of the drift. The company recently increased the pay of their men 25 cents per day, which brings the wages paid at this property on a par with that obtaining at the McIntyre and Dome mines. About forty men are employed at the Dome Lake.

### Hayden.

Arrangements are being made to explore the Hayden Mining Company's property at Poreupine by diamond drilling. Mr. Wm. Shovel has resigned from the management of the mine and at the present time mining operations are practically suspended.

### Davidson.

A number of diamond drills are at present working on the Davidson Mining Company's property at Poreupine and excellent results are being obtained. Results obtained in a drill hole sunk from the 400-ft. level of the mine were so encouraging that four other drill holes have been sunk from the 300-ft. level of the mine. In two of these new holes orebodies were encountered. One of these drill holes will penetrate the ground to a depth of 1,200 feet.

### Teck-Hughes.

The grade of ore being treated by the new 80-ton mill recently installed by the Teck-Hughes at Kirkland Lake ranges around \$7 to the ton. So far the only ore treated in the mill has come from development work. Later on an effort will be made to establish the average grade of the mine and it is anticipated that the mill heads will be considerably increased when this is done. Ore-bodies on the property run all the way from a few feet in width to forty feet of ore and as about four thousand feet of underground development has been accomplished, a large tonnage of milling ore has been blocked out. It has been found that the values increase with depth, and the future of the property is considered very promising.

### Elliott-Kirkland.

The shaft at the Elliott-Kirkland mine at Kirkland Lake is being driven to the 300-ft. level. At the 100-ft. level a crosscut was run to tap the vein which is an extension of the Kirkland Lake gold vein, and where encountered the values were not very high; however, this was expected as consistent values did not come in at the neighboring property until the 300-ft. level was reached. Two drills are working on the sinking of the shaft and it is expected the work will be completed within the next three months. The shaft is now down a depth of 190 feet.

### Croesus.

The new ball mill at the Croesus mine in Munro township is now in operation and the production of gold bullion from this remarkably rich property has commenced. Outside of the old mill of the Gold Pyramid which was burned last summer the Croesus is the first mill to operate in the Munro district. The mill has a capacity of about fifty tons a day, the process used being amalgamation and concentration of sulphides. The concentrates will be stored for future treatment. There is a large amount of high grade milling ore on the dump, which it is estimated will run about forty dollars to the ton, and it is safe to say that the Croesus mill heads will be the highest of any mine operating in Northern Ontario.

### Matachewan.

Favorable reports concerning prospect work being carried on in the Fort Matachewan district continue to come in. The formation of the rock is very similar to that of the Kirkland Lake district. On the Otisse claims in Powell township free gold has been found in a large dyke. Work on the Davidson claims is also being energetically prosecuted with very satisfactory results.

### Minaker-Kirkland.

Further work is proceeding on the new vein encountered on the Minaker-Kirkland property at Kirkland Lake. The vein has been opened up for over a hundred feet and two pits have been sunk, in which the vein was found to widen considerably, and the values have also increased. Development work is being vigorously prosecuted. Power has been arranged for from the Lakeshore mine and it is the intention of the company to immediately proceed with the sinking of a shaft.

### Lakeshore.

Development work on the new vein recently discovered at the 200-ft. level of the Lakeshore mine at Kirkland Lake is proceeding and very encouraging results are being encountered and it is said the new vein is one of the most important and spectacular finds made in the north country for many months. Where encountered first the crosscut ran through two wide veins of comparatively low grade ore. Drifting in a westerly direction was started on one of these veins. About 250 feet of drifting has been done and the grade of ore for half this distance is said to average about \$40 to the ton. However, at the present point of working the orebody has widened out to forty feet. It consists of four parallel veins carrying free gold and tellurides. The north wall has been established, but the south wall is still in good ore and it is believed the whole forty feet will average a good grade of milling ore. A considerable amount of high grade ore is already on the dump and with the one thousand tons already there from previous operations on other veins in the mine, there is a considerable tonnage of ore awaiting the completion of the installation of the new 80-ton mill, machinery for which is beginning to arrive at the property.

### Gold Discovery in McElroy.

A discovery of gold of more or less importance has been made on a group of claims situated in McElroy township about three miles from Boston Creek station. The find is said to have been made on a comparatively wide vein which shows free gold and tellurides. The claims belong to Haileybury people, and are about three-fourths of a mile northeast from the Boston Gold Leaf property.

**Skead.**

Growing activity is being manifested in the Township of Skead owing to recent developments there. The latest report of an important find comes from the Simpson claims which are about a quarter of a mile north of the Skead Development Company's property. The Broughtman claims are also reported to be proving up well under development. The two Hart claims on the west side of the Costello claims have been purchased by Mr. H. W. Crawford, of Haileybury.

**Miller-Independence.**

The new mill at the Miller-Independence mine in the Boston Creek, the first mill to be installed in this camp, is now in operation. For a time the tonnage treated will be about 30 tons per day but this will later be increased to fifty tons per day. Underground operations are being pushed vigorously and results are said to be very satisfactory.

**Trethewey.**

Interests closely identified with the Trethewey mining company of Cobalt are understood to have taken an option on a group of claims in the Township of Cane on the Elk Lake branch of the T. & N. O. Railway near Kenabeek Station. Exploration work will be commenced at once. On the surface numerous veins occur in which are found heavy leaf silver, and on one of the claims a shaft has been sunk a depth of fifty feet. The diabase ridge in which the claims are located is about half a mile in width and runs west-southwest from the township of Cane into Auld township, where is situated the Kenabeek mine. On the north claim of the group one vein occurs which is about two feet wide and composed of aplite in which silver occurs. Eighteen men are now at work on the property.

**Peterson Lake.**

A vein about three inches in width containing good grade ore has been cut at the 200-foot level of the Peterson Lake mine at Cobalt. Considerable argentite and ruby silver is in evidence and some of the ore will run fairly high. The vein is thought to be an extension of the No. 10 vein of the Nipissing.

**Adanac.**

Development work at the 310 foot level of the Adanac mine at Cobalt is proving very satisfactory. A vein which runs from three to five inches in width carrying good average values in ruby and leaf silver was recently encountered, and is being drifted on. The vein is in the Keewatin formation which at the present point of operations is close to the diabase sill. A short distance west this formation takes a dip to almost 500 feet and it is in this vicinity that the Adanac expects to obtain good results.

**O'Brien.**

The O'Brien mining company of Cobalt has posted notices assuring their men of the continuance of the bonus on their wages as long as the price of silver warrants the operation of the mine at a reasonable profit. This announcement was posted following a meeting of the management and the employees of the mine and it is understood to be the intention of other mining companies in the district to give their employees the same assurance that is conveyed in the notice of the O'Brien management to their employees.

**Shamrock.**

Mr. J. C. Hammond, president of the new company which has taken over the Shamrock mine near town recently and stated that it was the intention of the company to prospect the property at the lower levels

for which a considerable amount of money was available. Owing to the results obtained on the Beaver mine at the 1600-foot level it is thought the Shamrock also may have good ore beneath the sill in the same formation in which the Beaver and Temiskaming are now getting promising results.

**McKinley-Darragh.**

The construction of the new 200-ton oil flotation plant at the McKinley-Darragh mine is progressing rapidly and it is expected the plant will be in operation by fall. It is just one year since the McKinley-Darragh installed their first oil flotation mill of a capacity of 100 tons per day. The concrete foundations and part of the frame work of the new mill are now in place.

**Mining Corporation.**

The production of the Mining Corporation of Canada at Cobalt for the first sixteen weeks of the present year has totaled 1,400,000 ounces of silver. Dividends paid by this company up to March 31st total \$1,711,875.

**Nipissing.**

The latest report of the Nipissing Mining Company shows that the company mined during May ore of an estimated value of \$261,668, and shipped bullion from Nipissing and customs ore of an estimated value of \$405,600. There were no important new underground developments recorded during the month; but results from all current work continue to be satisfactory. Drifting on the Cobalt Lake vein has been nearly completed and 1500 feet of the vein has been developed at both the 420 and 520 foot levels. Some new raises are being started and crosscutting is in progress between the vein and the western boundary. Some of the surface dumps are now being removed to the low grade mill for treatment.

**Flies are Busy.**

Owing to continued wet weather throughout the north country and the consequent increase in the black flies and mosquitoes, a great many men who usually spend the summer in the bush prospecting and developing claims, are not doing so this summer. The flies are reported to have become so troublesome in the bush that even the Indian, fortified with the white man's mosquito oil is seeking relaxation from the pests by coming into the town, where flies are not quite so numerous as in the bush.



Tough Oaken Cyanide Plant, Kirkland Lake



**COAL AND COKE IN CANADA, 1917.**

The Mines Branch of the Department of Mines has received from the principal coal mine operators returns of their production during the first three months of 1917 on the basis of which the following estimates have been made of total production during this period. According to these estimates, the total production of coal during the first quarter of 1917 was 3,590,991 short tons, comprising 1,233,934 tons in January, 1,143,956 tons in February, and 1,213,101 tons in March. Corresponding records for the year 1916 are not available for comparison.

The record would appear to show that in Nova Scotia and British Columbia the average rate of production was less than the average rate of production during 1916; but in the provinces of New Brunswick, Saskatchewan and Alberta, greater than in 1916.

The exports of coal during the three months were 501,570 tons as against exports of 737,744 tons during the corresponding period of 1916.

The imports of coal during the three months were 3,921,824 tons, as against imports of 4,002,892 tons during the corresponding period of 1916.

The production of oven coke during the first three months of 1917 was 308,690 tons, the imports during the same period being 207,139 tons and the exports 5,606 tons.

**Coal Production, Imports and Exports.****Production in 1916 and 1917.**

—1917—				
	1916, tons.	January, tons.	February, tons.	March, tons.
Nova Scotia.....	6,912,140	530,696	466,650	482,923
New Brunswick....	143,540	17,117	16,736	17,547
Saskatchewan .....	281,300	36,820	26,820	22,322
Alberta .....	4,559,054	463,158	425,435	449,066
British Columbia...	2,584,061	186,143	208,315	241,243
Yukon .....	3,300	.....	.....	.....
<b>Production .....</b>	<b>14,483,395</b>	<b>1,233,934</b>	<b>1,143,956</b>	<b>1,213,101</b>
<b>Imports.</b>				
Bituminous .....	13,009,788	1,031,719	760,545	1,114,958
Anthracite .....	4,570,815	300,836	277,179	436,567
<b>Total .....</b>	<b>17,580,603</b>	<b>1,332,555</b>	<b>1,037,724</b>	<b>1,551,525</b>
<b>Exports.</b>				
<b>Total exports.....</b>	<b>2,135,359</b>	<b>174,408</b>	<b>120,828</b>	<b>206,334</b>

**Oven Coke Production, Imports and Exports.**

—1917—				
	1916, tons.	January, tons.	February, tons.	March, tons.
Nova Scotia.....	653,836	53,314	50,127	56,435
Ontario. ....	452,502	31,716	26,036	27,680
Alberta .....	42,548	4,390	3,637	3,425
British Columbia...	299,896	10,062	16,802	25,066
<b>Output .....</b>	<b>1,448,782</b>	<b>99,482</b>	<b>96,602</b>	<b>112,606</b>
<b>Imports. ....</b>	<b>757,116</b>	<b>49,394</b>	<b>63,849</b>	<b>93,896</b>
<b>Exports. ....</b>	<b>48,539</b>	<b>1,960</b>	<b>996</b>	<b>2,650</b>

**COAL AND COKE IN CANADA, 1916.****Revised Statistics and Comparison With 1915.**

Division of Mineral Resources and Statistics, Department of Mines, Ottawa.

Coal.	Calendar Years.	
	1915	1916
<b>Production by Provinces:—</b>		
Nova Scotia .....	7,463,370	6,912,140
New Brunswick .....	127,391	143,450
Saskatchewan .....	240,107	281,300
Alberta .....	3,360,818	4,559,054
British Columbia .....	2,065,613	2,584,061
Yukon. ....	9,724	3,300
<b>Total. ....</b>	<b>13,267,023</b>	<b>14,483,395</b>
<b>Distribution of Coal Production:—</b>		
Sold for consumption in Canada...	9,826,712	10,701,530
Sold for export to United States..	1,330,818	1,451,075
Sold for export to other countries.	297,343	284,513
<b>Total sales. ....</b>	<b>11,454,773</b>	<b>12,437,118</b>
Used by producers in making coke, etc.	701,975	804,814
Used by colliery operation and by workmen. ....	1,110,275	1,241,463
	1,812,250	2,046,277
<b>Stocks in producers' hands, Dec. 31...</b>	<b>171,205</b>	<b>78,702</b>
<b>Exports (as reported by Customs Dept.)</b>	<b>1,776,543</b>	<b>2,135,539</b>
<b>Imports (as reported by Customs Dept.):</b>		
Bituminous run of mine .....	6,106,794	9,504,552
Bituminous slack .....	2,286,916	3,505,236
<b>Total bituminous .....</b>	<b>8,393,710</b>	<b>13,009,788</b>
Anthracite. ....	4,072,192	4,570,815
<b>Total imports .....</b>	<b>12,465,902</b>	<b>17,580,603</b>
<b>Total Canadian consumption of coal..</b>	<b>23,906,692</b>	<b>29,865,856</b>
Used by railway locomotives (years ending June 30th) .....	6,677,536	8,677,354
<b>Oven Coke.</b>		
<b>Coal used in making oven coke.....</b>	<b>1,856,393</b>	<b>2,134,911</b>
<b>Coke Output by Provinces:—</b>		
Nova Scotia .....	584,993	653,836
Ontario. ....	316,211	452,502
Alberta. ....	24,187	42,548
British Columbia .....	275,375	299,896
<b>Total output .....</b>	<b>1,200,766</b>	<b>1,448,782</b>
<b>Exports. ....</b>	<b>35,869</b>	<b>48,539</b>
<b>Imports. ....</b>	<b>637,857</b>	<b>757,116</b>

**TAMARACK.**

The last step in the absorption of Tamarack by the Calumet & Hecla was taken last month when the Tamarack offices were closed, the books and records transferred to the Calumet & Hecla offices and a large part of the executive and clerical force of the Tamarack let out or transferred to other properties.

**DR. DALY ON GERMAN BEER.**

Professor Reginald A. Daly of Harvard blames beer for German outrages, and says latter represent the cumulative effect of "mildly alcoholic state" on the minds of men who have imbibed the national drink since childhood. Germanic peoples are the only group who feed alcohol to babies and very young children of the middle and upper classes.

## MARKETS

## SILVER PRICES.

		New York. cents.	London. pence.
June	25.....	78½	39¾
"	26.....	78	39¾
"	27.....	78½	39¾
"	28.....	78½	39¾
"	29.....	77¾	39½
July	3.....	77¾	39½
"	4.....	Holiday	39¾
"	5.....	78½	38¾

## TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.  
Cobalt oxide, grey, \$1.65 per lb.  
Cobalt metal, \$2.25 per lb.  
Nickel metal, 45 to 50 cents per lb.  
White arsenic 15 cents per lb.

July 9, 1917—(Quotations from Canada Metal Co., Toronto)  
Spelter, 12½ cents per lb.  
Lead, 14 cents per lb.  
Tin, 66 cents per lb.  
Antimony, 24 cents per lb.  
Copper, casting, 34 cents per lb.  
Electrolytic, 36 cents per lb.  
Ingot brass, yellow, 23 cents; red, 25½ cents per lb.

July 9, 1917—(Quotations from Elias Rogers Co., Toronto)  
Coal, anthracite, \$9.50 per ton.  
Coal, bituminous, nominal, \$9.00.

## NEW YORK MARKETS.

## Connellsville Coke—

Furnace, spot, \$14.50 to \$15.75.  
Furnace, contract, nominal.  
Foundry, spot, \$14.50 to \$15.75.  
Foundry, contract, nominal.

Straits Tin, spot, f.o.b., 62.50 cents.

## Copper—

Prime Lake, nominal, 30.50 to 31.50 cents.  
Electrolytic, nominal, 31.50 to 31.75 cents.  
Casting, nominal, 29.25 to 29.50 cents.

Lead, Trust price, 11.00 cents.

Lead, outside, nominal 11.17½ to 11.42½ cents.

Spelter, prompt western shipment, 9.17½ cents.

## Antimony—

Chinese and Japanese, nominal, 17.00 to 17.25 cents.

## Aluminum—nominal.

No. 1 Virgin, 98.99 per cent, 57.00 to 59.00 cents.  
Pure, 98.99 per cent remelt, 55.00 to 57.00 cents.  
No. 12 alloy remelt, 42.00 to 44.00 cents.  
Powdered aluminum, 85.00 to 90.00 cents.

Metallurgical magnesia—99 per cent plus, \$2.00 to \$2.50.

Nickel—Shot and Ingot, 50.00 cents.

Electrolytic, 55.00 cents.

Cadmium, nominal, \$1.15 to \$1.50.

Quicksilver, \$85.00.

## Platinum—

Pure, \$105.00.

10 per cent Iridium, \$110.00.

Cobalt (metallurgical) \$2.25.

Tungsten, per unit, \$20.00 to \$22.00.

Silver (official), 78½ cents.

Metal Products—Following quotations represent mill prices and are strictly nominal except in the case of lead sheets and sheet zinc:

## Sheet Copper—

Hot rolled, 39.00 to 40.00 cents.

Cold rolled, 40.00 to 41.00 cents.

(Shipments from stock 2c per pound extra.)

Copper bottoms, 50.00 cents.

Copper in rods (round), 40.00 cents.

Square and rectangular, 41.00 cents.

Copper wire, nominal, 37.00 to 38.00 cents.

Copper wire, July, August, 35.00 to 36.00 cents.

## High Brass—

Sheets, 33.25 to 35.25 cents.

Wire and light rods, 33.25 to 35.25 cents.

Heavy rods, 33.25 to 33.75 cents.

Low Brass—Sheet, wire and rods, 38.75 cents.

## Tubing—

Brazed bronze, 50.25 to 50.50 cents.

Brazed brass, 46.75 to 47.75 cents.

Seamless copper, 45.50 to 48.00 cents.

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Seamless bronze, 54.00 cents.

Full lead sheets, 13.75 cents.

Cut lead sheets, 14.00 cents.

Sheet zinc, f.o.b. smelter, 19.00 cents.

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Closing Quotations, July 10th, 1917.

	Silver.	Asked.	Bid.
Adams		13½	13
Bailey			103¼
Beaver		37½	37
Buffalo		137½	125
Chambers Ferland		13	12½
Comogas		150	100
Crown Reserve		30	29½
Gifford		34	
Great Northern		97½	96
Hargreaves		10¼	10½
Hudson Bay		10.00	38.00
Kerr Lake		170	150
Kenabook		17	16
La Roca		46	45
Lorram		16	
McKinley Darragh		65	62
Nipissing			7.50
Opht		66½	66
Peterson Lake		12½	12
Right of Way		0.50	0.00
Silver Leaf			0.00
Tuckerming		20	20½
Trothway		00	1.00
Wetland			60.00
White Reserve			10
York Ontario			



## Gold.

	Asked.	Bid.
Apex .....	.04 1/4	.04 1/8
Dome Extension .....	.19 1/2	.19
Dome Lake .....	...	.17
Dome Mines .....	...	11.50
Eldorado .....	.02	.01 1/4
Gold Reef .....	.02 1/4	.02
Hollinger Con. ....	4.49	4.47
Inspiration. . . . .	.05	...
Keora. . . . .	.12	...
Kirkland Lake .....	...	.36
McIntyre .....	1.58	1.57
Moneta .....	.12	.09
Newray .....	.55	.53
Porcupine Crown .....	.51	.49
Porcupine Gold, xr. ....	.01 1/2	.00 7/8
Porcupine Imperial .....	.02 1/2	.02 1/4
Porcupine Tisdale .....	...	.01 1/2
Porcupine Vipond .....	.32 1/2	.31 1/2
Preston East Dome .....	.05 1/4	.05
Schumacher. . . . .	.45	...
Teck Hughes .....	.48	...
Thompson Krist .....	.10	.08
West Dome .....	.20	.19 3/4

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On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

\* On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

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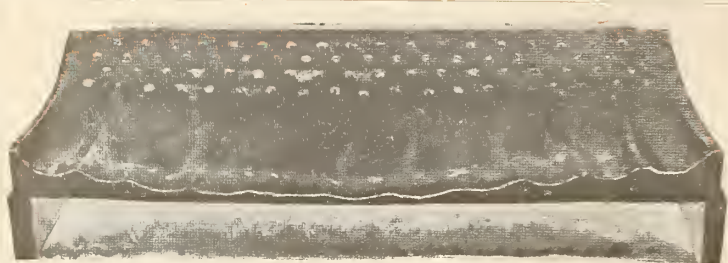
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# **CANADIAN** **MINING JOURNAL**

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TORONTO

No. 15

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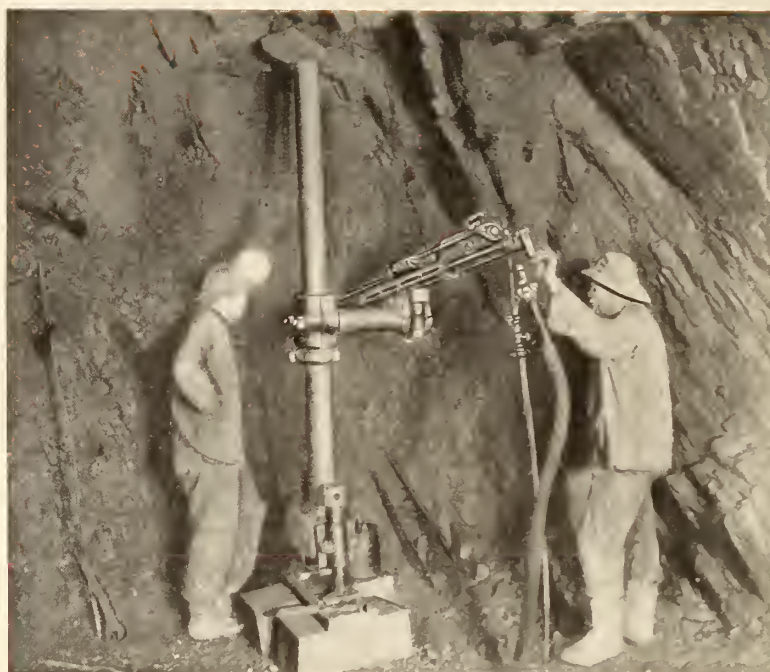
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Bulletin 670G.

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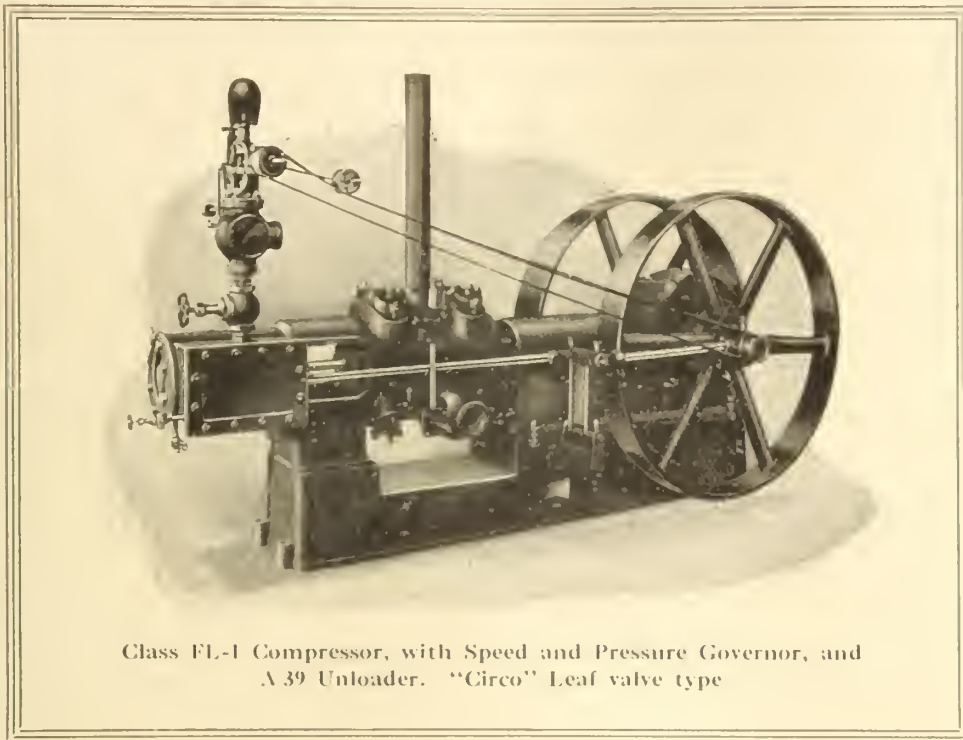
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Class FL-1 Compressor, with Speed and Pressure Governor, and  
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## The Cost of Air

The cost of compressed air is the sum total of several items, such as power, up-keep, heat, and friction losses in the machine itself, and the labor expended in operating the machine.

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The heat losses are minimized by thorough water-jacketing and friction losses are reduced by liberal bearing areas and superior lubricating methods.

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Automatic splash lubrication and automatic control and regulation bring the operating cost to the minimum.

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Bulletin K-302 describes this type of compressor fully.

Bulletin K-300-A describes the belt-driven single-stage machine. A copy of either or both publications promptly sent on request.



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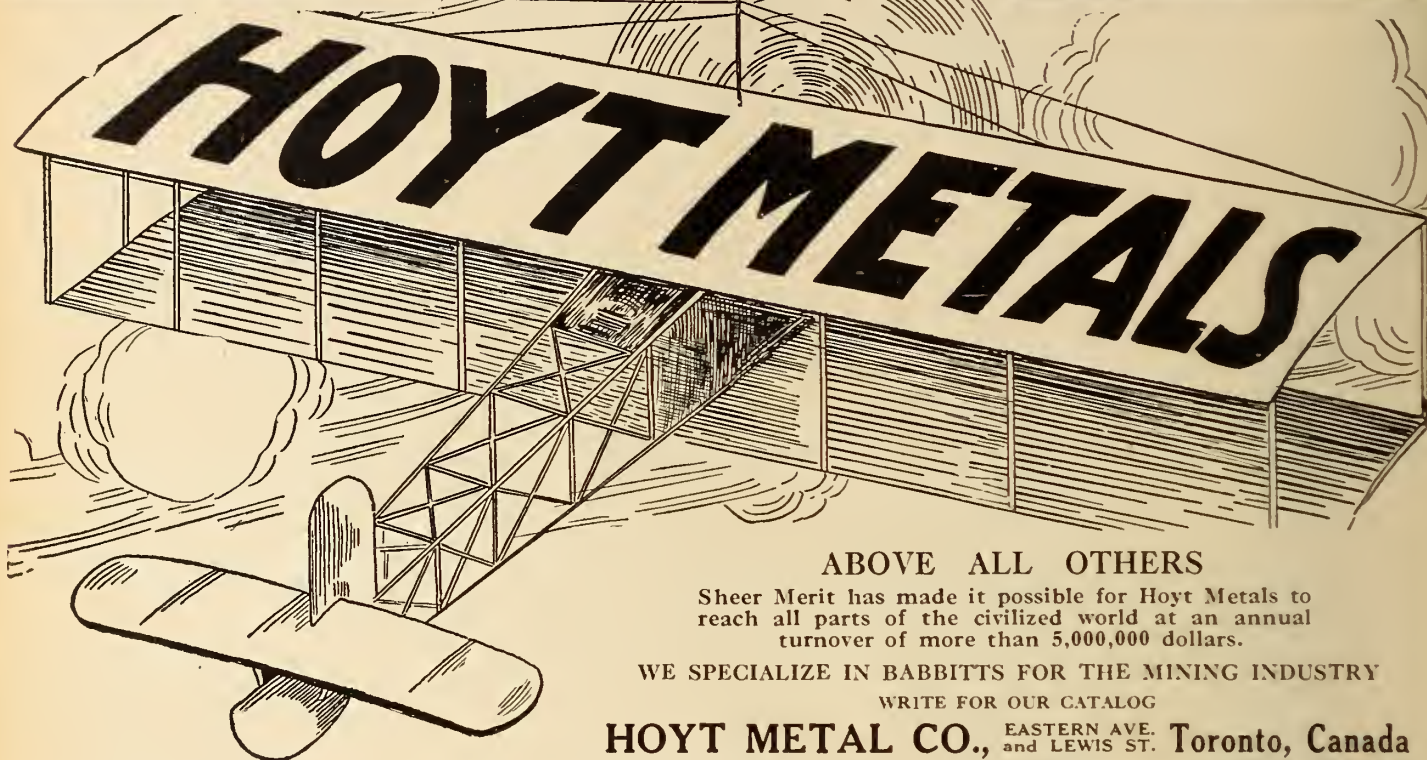
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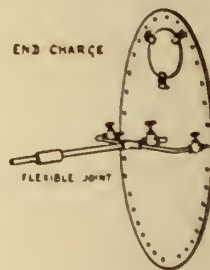
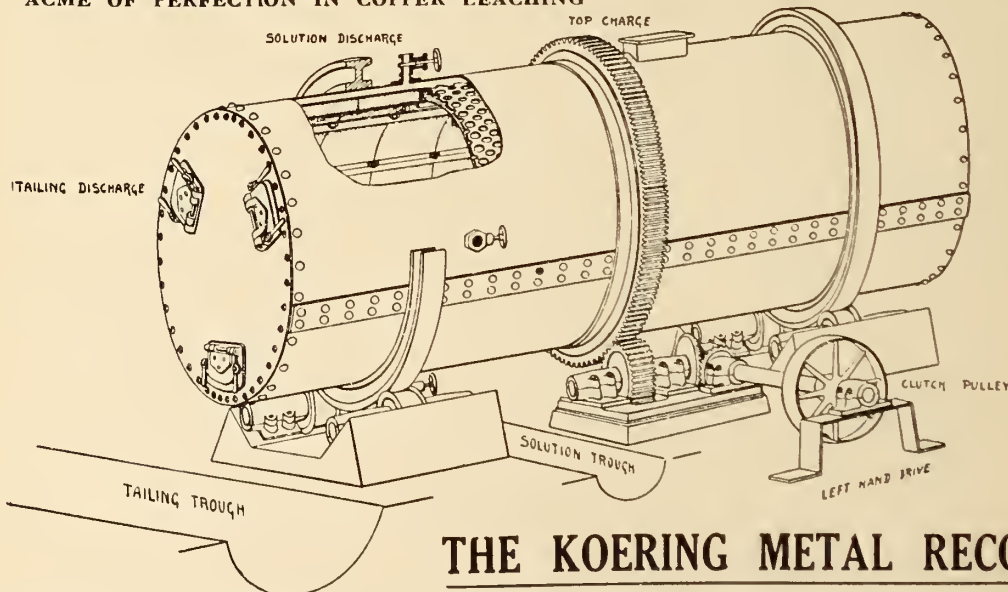
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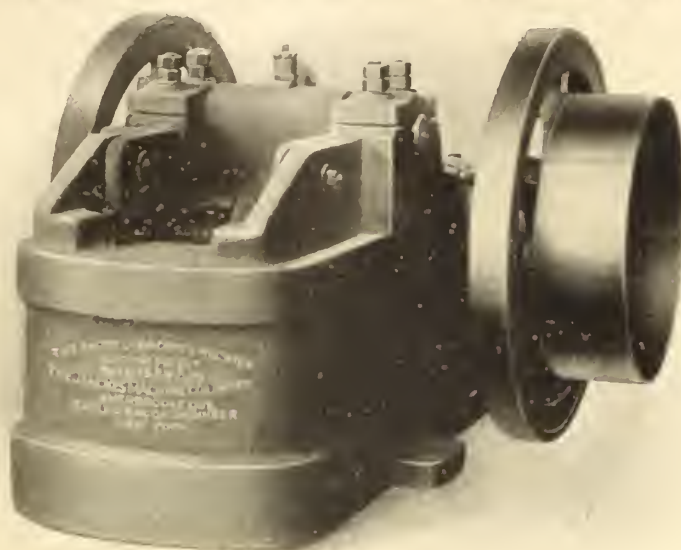
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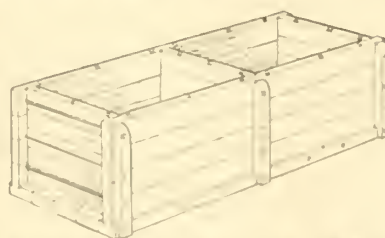
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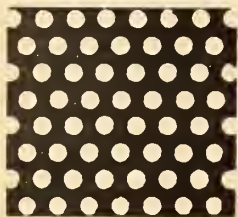
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The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1894, inclusive, \$88,904,199; for five years, 1894-1899, \$46,906,258; for five years, 1899-1904, \$90,391,394; for five years 1904-1909, \$121,618,733; for five years, 1909-1914, \$139,002,161, for the year 1915, \$29,447,508.

### Production During last ten years, \$267,607,077

Lode-mining has only been in progress for about twenty years, and not 20 per cent. of the Province has been even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than those of any other Province in the Dominion, or any Colony in the British Empire.

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Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

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Nova Scotia possesses extensive areas of mineral lands and offers a great field for those desirous of investment.

**Coal** Over six million tons of coal were produced in the province during 1916, making Nova Scotia by far the leader among the coal producing provinces of the Dominion.

**Iron** The province contains numerous districts in which occur various varieties of iron ore, practically at tide water and in touch with vast bodies of fluxes. Deposits of particularly high grade manganese ore occur at a number of different locations.

**Gold** Marked development has taken place in this industry the past several years. The gold fields of the province cover an area approximately 3,500 square miles. The gold is free milling and is from 870 to 970 fine.

**Gypsum** Enormous beds of gypsum of a very pure quality and frequently 100 feet thickness, are situated at the water's edge.

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*Commissioner of Public Works and Mines*



## PROVINCE OF QUEBEC

### MINES BRANCH

#### Department of Colonization, Mines and Fisheries

*The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, etc.*

The Mining Law gives absolute security of Title and is very favourable to the Prospector.

**MINERS' CERTIFICATES.** First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

**WORKING CONDITIONS.** During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

**SIX MONTHS AFTER STAKING.** At the expiration of six months from date of the staking, the prospector, to retain his rights, must take out a mining license.

**MINING LICENSE.** The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

**MINING CONCESSION.** Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

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The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

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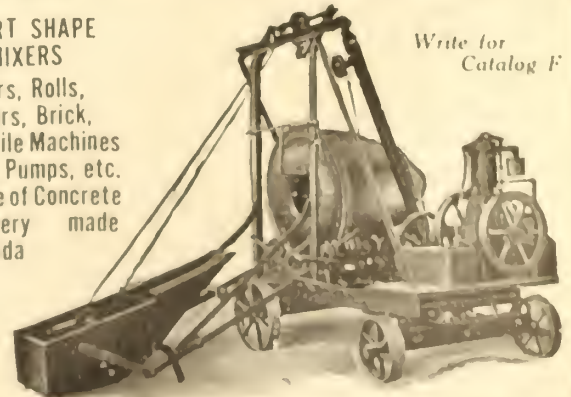
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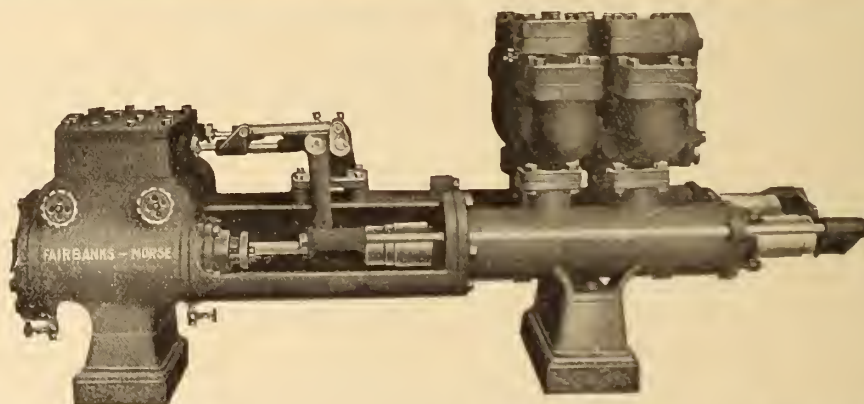
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# CANADA

## DEPARTMENT OF MINES

HON. E. L. PATENAUDE, Minister.

R. G. McCONNELL, Deputy Minister.

### MINES BRANCH

#### Recent Publications

- The Nickel Industry: with special reference to the Sudbury region, Ont. Report on, by Professor A. P. Coleman, Ph.D.
- The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.
- Building and Ornamental Stones of Canada (Quebec). Vol. III. Report on, by W. A. Parks, Ph.D.
- The Bituminous Sands of Northern Alberta. Report on, by S. C. Ellis, M.E.
- Peat, Lignite and Coal: their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.
- Annual Report of the Mineral Production of Canada During the Calendar Year 1914, by John McLeish, B.A.
- The Petroleum and Natural Gas Resources of Canada: Vols. I. and II., by F. G. Clapp, M.A., and others.
- The Salt Industry of Canada. Report on, by L. H. Cole, B.Sc.
- Electro-plating with Cobalt. Report on, by H. T. Kalmus, Ph.D.
- Electro-thermic Smelting of Iron Ores in Sweden. Report on, by A. Stansfield, D.Sc.
- Non-metallic Minerals Used in Canadian Manufacturing Industries. Report on, by H. Frechette, M.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

**Fuel Testing Laboratory.**—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.

**Ore Dressing Laboratory.** Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.

**Chemical Laboratory.**—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.

**Ceramic Laboratory.**—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.

**Structural Materials Laboratory.**—Experimental work on sands, cements and lines is also undertaken.

Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

### GEOLOGICAL SURVEY

#### Recent Publications

- Memoir 64. Preliminary Report on the Clay and Shale Deposits of the Province of Quebec, by J. Keele.
- Memoir 74. A List of Canadian Mineral Occurrences, by Robert A. A. Johnston.
- Memoir 77. Geology and Ore Deposits of Rossland, British Columbia, by C. W. Drysdale.
- Memoir 82. Rainy River District of Ontario. Surficial Geology and Soils, by W. A. Johnston.
- Memoir 84. An Exploration of the Tazin and Taltson Rivers, Northwest Territory, by Charles Camsell.
- Memoir 85. Road Material Surveys in 1914, by L. Reinecke.
- Memoir 87. Geology of a Portion of the Flathead Coal Area, British Columbia, by J. D. Mackenzie.
- Memoir 88. Geology of Graham Island, British Columbia, by J. D. Mackenzie.
- Memoir 89. Wood Mountain Willowbunch Coal Area, Saskatchewan, by Bruce Rose.
- Memoir 92. Part of the District of Lake St. John, Quebec, by John A. Dresser.
- Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.
- Memoir 94. Ymir Mining Camp, British Columbia, by Charles Wales Drysdale.
- Memoir 95. Onaping Map Area, by W. H. Collins.
- Map 59A. Wheaton, Yukon Territory.
- Map 60A. Wheaton, Yukon.
- Map 67A. Kirkfield Sheet, Victoria County, Ontario.
- Map 150A. Ponhook Lake Sheet, Nova Scotia.
- Map 175A. Ymir, Kootenay, British Columbia.
- Map 176A. Graham Island, Queen Charlotte Islands, British Columbia.
- Map 177A. Southern Portion of Graham Island, Queen Charlotte Islands, British Columbia.
- Map 180A. Espanola Area, Sudbury District, Ontario.
- Map 184A. Roberval, Lake St. John County, Quebec.
- Map 187A. Southern Plains of Alberta.

Applicants for publications not listed above should mention the precise area concerning which information is desired.

Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to The Director, Geological Survey, Ottawa.



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Mr. Percival, in an interesting article, published in "The Engineering and Mining Journal," New York, of 27th March, 1915, was the first to make known in the United States the opportunities offering in bauxite enterprises in Dutch Guiana.

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# THE CANADIAN MINING JOURNAL

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Editor

**REGINALD E. HORE**

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We are pleased to be able to publish in this issue some account of Professor S. F. Kirkpatrick's contributions to the metallurgy of the silver ores of the Cobalt district. Such work deserves recognition. It is fitting that the McCharles prizes has been awarded to a Canadian metallurgist who has played an important part in the establishment of a new industry in Canada.

The judgment recently handed out in the Sudbury sulphur smoke cases, indicates that there is little doubt that real damage is done to farms in the neighborhood of the roast heaps. Claims for damages are to be expected each year; but extravagant claims are not likely to be so popular in the future. It is to be hoped that a reasonable basis will be found for settling claims without recourse to lawsuits.

The high price now being obtained for silver is likely to result in quickening of development of properties in the silver-bearing areas of Northern Ontario. Many prospects that were turned down when the silver was selling at less than sixty cents an ounce and arsenic at two cents a pound will be reconsidered in view of the present prices for the contents of ores of the Cobalt district. It is not unlikely that important developments will take place in spite of the shortage of labor and the high cost of supplies.

The Industrial Workers of the World are proving to be, what their history might lead one to expect, a source of annoyance to the citizens of the United States at a time when even rabid socialists might have the good sense to devote some thought to the welfare of the country in which they live. It is not surprising that citizens of Bisbee deported the I.W.W. agitators from the Bisbee district, or that the Citizens Alliance of the Michigan Copper Country has given warning to agitators at Calumet. Reports of I.W.W. activities in various parts of the United States indicate that the Germans knew where their money would give results; but that they overestimated their ability to conceal their influence. Realization of the menace will doubtless result in stern measures for suppression of traitors and their dupes in other parts of the United States as well as in Michigan.

A disastrous explosion is reported to have occurred in No. 2 colliery of the Dominion Coal Co. at New Waterford, Cape Breton. It is known that many lives have been lost, the list including several brave men engaged in rescue work. It is hoped that fire will not follow.

This issue goes to press too early to give particulars of the disaster. It is already known, however, that many miners were killed at their work. That they died bravely we have no doubt.



**WINNER OF THE McCHARLES PRIZE, 1917.****S. F. KIRKPATRICK.**

Professor of Metallurgy, Queen's University, Kingston.

**CHAS. DRYSDALE AND WM. GRAY DROWNED.**

Invermere, B.C., July 12.—While attempting to cross the Kootenay River, near Cross River, on a raft yesterday, Charles W. Drysdale, of Ottawa and Montreal, chief of the geological survey party, and his assistant, Wm. J. Gray, a student of aviation at Vancouver, were drowned by the raft upsetting. The bodies have not been recovered, having been swept away by high water. George Smith was also on the raft, but he reached shore.

**CONSOLIDATED MINES SELECTION CO.**

The appointment of Mr. J. B. Tyrrell as Canadian representative for the Consolidated Mines Selection Co., Ltd., is an indication that this strong company is to take greater interest in mining in Canada. The company holds a controlling interest in Brakpan Mines, Ltd., Spring Mines, Ltd., Rand Selection Corp., Ltd., and New Era Consolidated, Ltd., and a large interest in Daggafontein Mines, Ltd., Burma Mines, Ltd., Irtysk Corporation, Ltd., Hampden Cloncurry Mines, Ltd., Mt. Lyell Mining and Railway Co., Ltd., and Itabira Iron Ore Co., Ltd.

The directors of the company are W. McDermott (chairman), R. J. Freeheville, F. W. Green, L. Oppenheimer, B. Kitzuger and J. S. Wetzler.

**CORRESPONDENCE.****Professor Haultain and the Geologists.**

Editor, Canadian Mining Journal:

Sir,—At the March, 1916, meeting of the Canadian Mining Institute, when Dr. Adams had concluded his address on the discovery of phosphate in the Rocky mountains, Prof. H. E. T. Haultain said:

"I make the most profound obeisance. . . . Dr. Adams' work represents the most magnificent piece of prospecting of which one has knowledge."

One of his auditors said to his neighbor:

"That is the first time I ever heard Haultain say anything complimentary about the work of a geologist."

His cynical friend replied:

"It is only because he was taken by surprise. He regrets it already, and, if you give him time, he will take it all back."

All who read Prof. Haultain's communication in your issue of July 1st will agree that the cynic was also

AN OBSERVANT OBSERVER.

July 18, 1917.

**READY FOR THE I. W. W.**

Houghton, Mich.—The atmosphere at the Lake copper mines, somewhat foggy last week because of rumors of impending trouble with the I.W.W., seems to have cleared. The clarifying process undoubtedly was effected by a monster mass meeting held under the auspices of the revived Citizens Alliance at Calumet Sunday afternoon. A gathering of 5000 people warned the disaffected, if there are any, in simple terms that the patriotic citizens of the copper country will not tolerate agitation that may tend toward the curtailment of copper production at a time when that production is vital to the nation. The citizens of the copper country in assuming this attitude stood squarely on the issue of loyalty to the United States and on no other.

**GRANBY CONSOLIDATED.**

Granby Consolidated made net earnings of \$5,500,000 in its fiscal year ended June 30, according to preliminary estimates. This compares with \$4,100,000 in the preceding fiscal period. This was equal to about \$35 per share, against \$25 in the 1915-16 year. Dividends paid during the past year amounted to \$9 per share.

Copper production in 1916-17 showed little change from the previous year—41,312,884 pounds, against 42,198,083 pounds in 1915-16.

Last February the company encountered extreme cold weather, particularly at Anyox, which cut production down materially. The Grand Forks plant was forced to close down early in April for lack of fuel, although this situation has since cleared up and the smelter in the Phoenix district should be in position to resume operations by the first of August.

Granby has been spending large sums during the past few years in building up its new plant at Anyox to the point where it can be regarded as one of the most economically operated in the western copper camps. The management has plans for more of these improvements and additions during the fiscal year just started which will call for further large expenditures. —Boston News Bureau.

## S. F. KIRKPATRICK'S CONTRIBUTIONS TO METALLURGY OF COBALT SILVER ORES.

By S. B. Wright.

In connection with the treatment of cobalt-silver ore from the Cobalt district, Mr. Kirkpatrick carried out an elaborate research at the School of Mining, Kingston, in 1905. The Deloro Mining & Reduction Company, Limited, was formed in 1906 for the purpose of treating cobalt-silver ore, adopting the processes worked out by Kirkpatrick. The plant started operating in November, 1907.

### Extraction of the Silver from Ores of Cobalt District.

The original process consisted in cyaniding the mill-ore direct in conical-bottom agitation tanks, the circulation of pulp and solution being performed by means of centrifugal pumps drawing from the bottoms of agitators and delivering on to spreaders at the tops. After the necessary clarifying of solutions, the silver was precipitated by means of aluminum dust, fluxed and melted down to commercial bar 996-999 fine. The ore residue after cyaniding was smelted to a speiss for the extraction of the remaining silver and of the cobalt, nickel and arsenic values.

Subsequently, 1908, on account of the very variable nature of the ores handled and of the uncertainty of their amenability to cyanide treatment, the direct smelting of the ore was adopted. This, of course, produced a speiss containing much higher silver values; but process losses did not increase.

The treatment of the speiss, whether low or high silver, consists in roasting down to 10% As, and lower, in mechanically rabbled furnaces, chloridizing this roast speiss with salt in muffle furnaces and cyaniding the product.

This treatment of a chloridized speiss by cyanide was undoubtedly an entirely new departure in metallurgy, and as its success was dependent on the use of aluminum as a precipitant, this part of Kirkpatrick's processes has been of the greatest importance. Particularly so in view of the fact that on account of the restricted market for cobalt, it was necessary to have a method of extracting the bulk of the silver values without incurring heavy costs on the cobalt contents which might have to be stored for a long time.

This method of treatment proved satisfactory, and has been carried on from the start.

### Advantages of Aluminum Dust as a Precipitant of Silver.

In our case, one part by weight of aluminum precipitates eight parts of silver. With solutions less rich in silver than those obtained in our practice, a slightly lower efficiency is naturally expected (e.g., Nipissing Mining Co.'s low grade mill practice); but the regeneration of the cyanogen combined with the silver in solution comes up to the theoretical figures in all cases.

This regeneration is of course of the utmost importance, as it would enable aluminum to compete with zinc at normal prices even if there were no other advantages, the regeneration of cyanide in the case of zinc being practically nil.

A further important advantage of aluminum, however, is the fact that by means of a simple melting operation without any subsequent refining, silver bullion 996-999 fine is produced, all further refining charges being thus obviated.

As the refiners' charges on all bullion below 996 fine and on brittle bullion range from one-quarter cent per ounce up, it will be readily seen that this point is of great importance in the matter of costs.

Quite apart from the advantages already mentioned, it is a fact that in attempting to apply zinc as a precipitant to the cyanide solutions used on cobalt-silver ore, the solutions become foul so rapidly that the cyanide treatment would be commercially unsuccessful.

This was proven in the case of the Nipissing Mining Co.'s low grade mill, which was originally designed for zinc dust precipitation, but was eventually changed to aluminum dust.

The first mill in Cobalt to treat low grade ore by the cyanide process successfully was that at the O'Brien mine, which adopted Kirkpatrick's aluminum precipitation and the general treatment advised by Kirkpatrick after a somewhat elaborate series of tests had been conducted by him on that ore.

Since that time a very large quantity of silver has been produced in Cobalt by this process, but I am unable to give actual figures.

The output of the Deloro Mining & Reduction Co.'s plant from 1906 to the present time has amounted to approximately 40,375,000 ounces of silver, of which about 50 per cent. has been produced by aluminum precipitation.

### Extraction of Cobalt and Nickel.

In the extraction of the cobalt and nickel from the ore by the processes worked out by Kirkpatrick, the following figures are interesting:

	lb.
Cobalt (metal), in form of oxides, metal, etc.	1,168,491
Nickel (metal), in form of oxides, metal, etc.	371,747
Arsenic (white) .....	15,646,258

The cobalt oxides produced are of the highest grade, our black oxide being guaranteed to contain 70 per cent. cobalt. In 1915 the production of cobalt and nickel metals was started in our works, and we are now able to produce cobalt metal in the forms required by the market, at the rate of about one ton per day.

In the extraction of the cobalt and nickel from the speiss (residues) Kirkpatrick's first aim was to get away from the old hydrochloric acid treatment, with its attendant difficulties. This he succeeded in doing by sulphating the above mentioned residues with  $\text{H}_2\text{SO}_4$ , rendering the bulk of the iron insoluble by roasting, and eventually obtaining a neutral cobalt-nickel sulphate solution from this material. By the methods employed, the question of corrosion of plant by acid solutions, etc., is practically overcome, in fact we are able to use wooden tanks and iron pipe systems throughout.

The advantages of such a process over earlier methods in the extraction of these metals will be readily appreciated by all metallurgists.

As we also produce about 150 tons of refined white arsenic per month, it will be appreciated that Kirkpatrick's work on the metallurgy of cobalt-silver ore has resulted in the successful extraction of the silver, cobalt, nickel and arsenic contents of the ore, each and all of these being produced in the refined and finished state in Canada by a Canadian company.

The operations of this company have undoubtedly enabled the Cobalt mine owners to obtain far higher prices for their ore, for they were at the mercy of the United States smelters until we came into the field.



### LABOR ORGANIZATION IN CANADA.

The sixth annual report on Labor Organization in Canada, containing statistics, etc., for the calendar year 1916, has been issued by the Department of Labor.

Figures are given showing the extent to which the trade unionists of the Dominion have contributed to the Canadian expeditionary forces since the outbreak of the war in August, 1914. Enlistment of one or more members has been reported by 1,284 local branch unions, the recruits numbering 21,599 and reservists 593, a total of 22,192 trade unionists in the ranks.

The loss in trade union membership recorded in the two previous years has been partially overcome by the increase of 17,064 reported for 1916, the total numerical strength at the close of the year being 160,407. In all there are 1,842 local branch unions in Canada, 1,626 comprising 129,123 members, being affiliated with international organizations, 189 with 22,884 members are connected with non-international bodies, and 27 having 8,400 members are independent units. There was a loss of 35 international local branches during the year, but the membership was increased by 14,401; the non-international bodies lost two branches and 780 members, and the independent units were decreased by four, but the reported membership shows a gain of 3,443. The membership of all classes of organized labor in Canada as reported to the Department for the past six years has been as follows:

1911 .....	133,132
1912 .....	160,120
1913 .....	175,799
1914 .....	166,163
1915 .....	143,343
1916 .....	160,407

Of the 1,842 local trade union branches in Canada, 828 of them are located in eighteen cities, and 589 reported a membership of 69,225, representing over 40 per cent. of the entire trade union membership in the Dominion. Montreal occupies first place as to number of local branches, while Toronto, Winnipeg and Vancouver follow in the order named.

Nearly all of the central labor organizations operating in Canada have benefit features on a varying scale. A table is furnished showing the expenditure made on this account by the various organizations, the disbursements for 1916 being \$12,502,128, a decrease of \$2,063,237, as compared with the payments made in 1915. The expenditure for each class of benefit was as follows:

Death benefits .....	\$7,808,225
Strike benefits .....	2,811,426
Sick and accident benefits.....	1,120,186
Old age pensions .....	461,780
Unemployed and travelling benefits	106,458

Four of the non-international bodies reported having made payments on account of benefits, the total expenditure amounting to \$11,933.

A statement is also published showing the amount paid in benefits for the year 1916 by local branch unions in Canada to their own members, the disbursements aggregating \$248,180, an increase of \$119,509 as compared with the expenditure for 1915. The payments made on account of each class of benefit was:

Death benefits .....	\$56,646
Unemployed benefits .....	2,121
Strike benefits .....	15,542
Sick benefits .....	146,592
Other benefits .....	27,279

A chapter gives details of restrictive measures which have been adopted by certain labor organizations against members joining the military forces, and the action of central labor bodies in Canada on registration is also recorded.

The report follows closely along the lines of former reports on Labor Organization in Canada, the various phases of the scheme of organization which have been developed being given due consideration.

The report serves as a directory of trade unions for the Dominion for 1917, including as it does particulars not only of every known local trade union in Canada, but also a list of all international and non-international central organizing bodies, together with the names and addresses of the chief executive officers.

### CONSOLIDATED SMELTERS.

Montreal, July 21.—The increasing activities of the Consolidated Mining and Smelting Company are slowly but surely bringing the big Canadian mining concern into a position similar to that occupied by the celebrated Anaconda Mining Company of the United States. The production of the company this year, according to information furnished The Financial Times will establish a new high record of earnings, in fact, we are in a position to state that for the year ending September next, the earnings from the zinc and lead operations alone will be more than sufficient to pay the dividends twice over, and as the disbursements on the stock during 1916 amounted to \$776,337, a fair idea may be had of the profits accruing from the operations mentioned, to say nothing of the earnings from the gold, silver and copper production.

The marked progress in the development of this company is indicated by the fact that the production of zinc is now almost 50 tons per day. This electrolytic zinc plant was producing about 10 tons of zinc daily about a year ago, and the management felt well satisfied with themselves because of the fact that they would ultimately turn out about 25 tons daily. That their expectations have been greatly exceeded and that the plant has made phenomenal progress is indicated by the present increased production to 50 tons daily. The large gain in earnings due to this increased output will be further augmented when it is considered that while the price of zinc in 1914 was .495 cents it is now quoted at 8½ cents.

The expansion in the output of lead and copper is equally encouraging, the demand for these metals being so insistent that the output is sold for months ahead and, of course, at advancing prices. Lead to-day is quoted at 10¼ cents compared with .385 cents in 1914, while copper has advanced from 13½ cents at the beginning of the war to 28½ cents to-day. That there will be a continued demand after the war for refined copper and zinc is easily appreciated as there is no reason why the entire output of these metals should not be absorbed by the Canadian metal trades and fabricated by Canadian workmen—a condition possible only when these metals are available in a refined state.

With the increased earnings, and the elimination of the heavy outlay which during 1916 was applied to construction of new plants, the annual statement for the year ending September next will undoubtedly prove a pleasant document for the shareholders.—Financial Times.



**SULPHUR SMOKE DAMAGES.**

Sudbury, July 20.—His Honor J. J. Kehoe, Judge of the District Court of Sudbury, handed out the following judgment on July 16, in five claims against the Canadian Copper Co. made by Jos. David, Louis B. Gironx, Morley Arthur, Matti Lindala and John Lindala:

These five cases are for claims made by farmers for damage to their crops and meadows through sulphur, gas or smoke which came mostly from the new roast bed of the defendants, and in a lesser degree from the older roast bed.

In the David and Gironx cases the defendants deny that there was any sulphur that reached the lands in question, but admit in the other three cases that the streams of sulphur smoke did reach the lands, but insist in two of the cases that the damage was so slight as not to be appreciable. In the case of the plaintiff, Arthur, they also maintain that the claim for damage is exaggerated.

Dealing firstly with the question as to whether the sulphur smoke reached the land of David and Gironx, there is the evidence not only of these two plaintiffs but of four other witnesses, who testify to having seen the sulphur smoke from time to time during May, June, July and August of 1916. Sometimes the smokes were light, at others in greater volume, and on one occasion it was so thick that it was difficult to see for any distance, and it was sufficient to cause the person who experienced it to suffer from heavy sensation of choking. These witnesses spoke of the duration of the smoke as well as they could recollect it each time, the time of the day that it happened, and of the blight that was immediately visible after.

Against this evidence the defendants offered the evidence of experts who travelled the country in automobiles, following the track of each and every wave of smoke, and who also spoke of what they saw of David's and Gironx' farms and they asserted that from following the line of smokes from the defendants' roast beds and seeing final ending of them and from inspecting the crops in question, that no sulphur smoke reached even near to these farms.

On both sides the evidence was positive. I may add that I am well satisfied that all of these witnesses on both sides believed what they said. Deciding between them as to what really happened I am led to the conclusion that I must find that sulphur smoke streams did reach these lands as described by those who said that they saw them, and also that the plaintiffs in each case suffered damage by the injury caused to their farms. The reason for my so deciding is obvious. The witnesses who speak of what they see and feel are to be taken in preference to those who speak from signs that they see and the observations which they make after the events have happened.

It remains therefore only for damages to be assessed in these as well as in other cases.

In coming to assessment of damages I do not find in any case that the plaintiffs have underestimated them. In some cases they have been unreasonable. The acreage of cultivated land as claimed turns out to be considerably less in some instances than actual survey shows, and the value of the crops as claimed is, according to sale prices, usually higher than it should be. Then no account is taken of diseases to plants and the year 1916 is put forward as a year of good growing

weather. Losses on crops in 1916 are made by comparison with the yields of other years which were much better.

If a crop which has been visited by sulphur smoke becomes in a degree blighted, it by no means happens that the sulphur dioxide causes all the damage. In the smoke zone and out of it throughout this region and in other parts of this province different plant diseases have been conclusively proven before me as to each of the cases.

It may be here mentioned that I have not only heard expert testimony on this branch of the case, but have examined the several written authorities submitted, all of which for the practical purpose of dealing with the matters in dispute are fully summarized in the judgment of Mr. Justice Middleton in the cases tried before him. It will serve no useful purpose to repeat as to these. I have carefully considered the evidence given on the trials before me which lasted six days and three evenings, listened attentively to the one and a half days' argument which followed and from every point of view that I could, I have weighed the evidence in all its bearings as to weather, soil, drainage, cultivation, prices, dates, diseases, palatability of blighted fodder, wind, moisture, etc.

In cases of claims for damages the presumption is against the spoiler. In some cases where the wrongdoer is wanton in committing damage the law makes him smart heavily for it and even double damages are allowed. In the cases now before me I cannot say that there is any wantonness. The defendants have established their rights in the actions tried before Mr. Justice Middleton to carry on their work of roasting and smelting and an injunction was refused as against them. The judgment says that "It is impossible for the individual to assert his individual rights as to inflict a substantial injury on the whole community." Therefore the injunction which would have practically closed the company's operations was denied. But the right to damages for injury from the spreading of the sulphur fumes remains and so actions such as these now tried before me are brought.

In the sections tried before Mr. Justice Middleton he speaks of the plaintiffs as those who having gone "into that area to farm, have (in almost all cases) gone there with their eyes open seeking to avail themselves of a market in which abnormally high prices rule because of the demands created by those mines and their great distances from ordinary sources of supply. In these present cases three of the plaintiffs have settled, cultivated their farms and made their homes before there was any mining and nickel was not only unknown to exist, but its present varied usefulness was also unknown. They came at a time, too, when lumbering, affording a profitable market for the farmer, was in full swing. Railway construction also brought them hither and towns and villages sprang up, the existence of which in the Sudbury district is more due to other causes such as I have indicated than to mining operations.

The awards of damages should not be unduly pressed against the defendant even if he is a wrong doer. But they should be full, or as Mr. Justice Middleton says, "liberal."

In arriving at the damages there are many difficulties and a close calculation can not be made. The considerations to be taken into account have already been mentioned. The amounts which I have arrived at are



as follows: Joseph David, \$175; Louis B. Giroux, \$150; Morley Arthurs, \$300; Matti Lindala, \$140; John Lindala, \$80. Counsel can speak to me on the question of costs.

There remain quite a number of cases yet to be tried and it looks as if an era of litigation of this kind is started. The region tributary to the smoke fumes of the new roast beds of the defendants is one of good cultivation.

The history of damage claims of this kind is that at first they were settled without litigation. For a period of six years prior to 1915 Sheriff Irving settled hundreds of claims, not one having been entered in suit. There followed the arbitrations of 1915 which, rightly or wrongly, produced intense dissatisfaction among the farmers and others interested. Suits followed since then. A remedy that would do away with this widespread litigation and the consequent great expense is greatly to be desired. A whole countryside in continual lawsuits is in every way a great bane to the community. I venture to express the hope that in some way this condition will be avoided.

### BOUNDARY DISTRICT OF BRITISH COLUMBIA.

In the northeastern part of Boundary district of British Columbia there is a mineralized region known as Franklin camp. Several Geological Survey officials have made investigations in that part of Grand Forks mining division and their reports have been published by the Survey. The British Columbia Department of Mines, too, has given it some attention, and in 1914 it was visited by Mr. A. G. Larson, mining engineer, then of Vancouver, B. C., under instructions from the Provincial Minister of Mines, and his report was first published in bulletin form, under title of "The Mineral and Other Resources of the North Fork of Kettle River," one of the forks of which stream passes through Franklin camp. Owing to its distance from a railway, which is 25 to 30 miles, there has been comparatively little ore-production made in the camp, the only property that has shipped ore on a commercial scale being the Union mine, which sent out 261 tons of ore in 1916 and 520 tons in 1915, according to statements printed in Provincial official publications. A quotation from one of those publications follows:

"Of the ore produced from the Union mine in 1915 about 400 tons was shipped to the Granby Company's smelting works at Grand Forks, and the remainder to the Consolidated Company's smeltery at Trail. A good idea of the average value of the ore is conveyed in a report by the mine superintendent, in which it was shown that the average gold and silver contents of more than 200 tons of ore shipped to Grand Forks were 0.85 oz. of gold and 45 oz. of silver to the ton. The cost of hauling 25 miles to the railway was \$13.50 a ton; freight by railway to smeltery was \$1.50, and charge for smelting \$6.75; total freight and treatment costs, \$21.75 a ton, which is a rather heavy handicap on mining in Franklin camp. A earload shipment was made to trail from the Maple Leaf, which group, lying contiguous to the Union group, is also described in the bulletin. The Gloster group was bonded by the Granby Company, and some development work done."

On June 22nd, the Grand Forks Gazette published the following account of mining in Franklin camp:

"An important strike of native copper was made this week on the Maple Leaf mineral group in Franklin camp. The strike has been made at the foot of the mountain, 1000 ft. below the main workings, and 40 ft.

of the contact deposit has been uncovered. In this instance instead of chalcopyrite, as was the case in the upper workings, the ore is native copper and red oxidised copper, and in addition it contains about a quarter of an ounce of platinum to the ton, as well as substantial value in silver.

"The Maple Leaf is near the Union mine, the biggest shipper of the North Fork, and considerable development work was done on it a number of years ago and some ore was shipped. For some years, however, little or no work was done until the past few months, when Mr. H. W. Young, who is acting manager, undertook plans looking to more active work. About a fortnight ago seven men were started to work with Mr. Thomas Newby, a veteran prospector, in charge as foreman.

"In line with some suggestions made by Washington State College, which examined several samples of Maple Leaf ore, the new development work was started to determine the depth of the deposit. A comparatively small amount of work was done before making the new strike.

"Plans are being made for the installation of a new amalgamator and concentrator which is manufactured in Vancouver, B. C. Satisfactory reports concerning its operation have come from the coast and half a ton of Maple Leaf ore has been sent to Vancouver for testing purposes, and if results are satisfactory installation will follow.

"The proposed plant is said to give complete recovery of all minerals, and in addition will separate each mineral by itself, while at the same time having a capacity of 50 tons a day. Should the plant give the results desired it will mean a great boon not only to the Maple Leaf but to North Fork mining generally, but should it not operate satisfactorily, Mr. Young says that a small smelter will be put in.

"A new find has also been made on the Union mine, where manager Lewis Johnson has seven men employed at development work in a tunnel at a depth of about 300 ft. from the main workings. Work on the tunnel has been of a periodical nature and ore was struck last week after driving nearly 300 ft. Mr. Johnson expects to make further shipments in the course of a month or two.

"Nearly 100 men are now engaged in mining in the Franklin camp, the largest number for more than a decade. This is partly due to miners availing themselves of the opportunity while the Granby Company is working so few men to do assessment work on their claims. Mr. Elmer Rice has been getting very encouraging results on his property, on which he has completed 100 ft. of development work. Matt Frankovitch is also doing considerable work on his claims, which are at Franklin townsite."

### OBITUARY.

Mr. John Stockett, brother of Mr. Lewis Stockett, manager of the coal branch of the Canadian Pacific Railway Co.'s Natural Resources Department, at Calgary, Alberta, and of Mr. Thos. R. Stockett, until quite recently general manager at Nanaimo, Vancouver island, B.C., for the Western Fuel Co., of San Francisco, California, was found dead in the offices of the Galt Coal Company, at Lethbridge, Alberta, on the morning of June 27th, heart failure, presumably, having been the cause of death. He had been ailing for some time, but had only recently returned from a holiday trip, seemingly in improved health.



### THE PAS MINERAL AREA.

The Pas, Man., July 13.—Mr. F. H. Kitto, D.L.S., representing the Natural Resources Intelligence Branch, Department of Interior, has just returned from a trip through Northern Manitoba's mineral belt, on which journey he was accompanied throughout by Mr. J. A. Campbell, Commissioner.

The party left here by the Ross steamer "Minasin," on June 26th, and arrived back by Hudson Bay Railway on an extra train last Tuesday, thus completing the round trip in exactly two weeks, an exceedingly quick trip considering the ground covered.

Mr. Kitto was very enthusiastic regarding the country through which he travelled, not only as to its mineral resources, its fish, timber and pulp wood, but as to the agricultural possibilities of a considerable portion of it.

The party reached Sturgeon Landing in record time, arriving there Wednesday evening at 7 o'clock. There was manifest at that point considerable activity in connection with the loading of ore, construction of the Athapapuskow road, and the departure of the various passengers to different northern points. Mr. Kitto's party got away early the following morning, and he and Mr. Campbell walked over the new road along Sturgeon and Goose rivers, a distance of eight miles. The road for this distance is already in pretty fair shape, requiring only some finishing touches in the way of culverts, drainage and a little corduroy. Contractors Burman and Boyd have a gang of men at work further on in that part between Goose and Athapapuskow Lakes. The travellers were struck with the possibilities of this region from an agricultural standpoint. Along these rivers there is a considerable stretch of good arable land, and several gardens at Sturgeon Landing give evidence of this.

### Lake Athapapuskow.

Goose Lake was negotiated that afternoon and Goose Creek the following morning, when the great Lake Athapapuskow—the lake of many rocky islands—was reached. From a scenic standpoint this lake is not surpassed, if it is equalled, on the continent, the rocky shores in some places rising to a height of 150 to 200 feet. They are covered with a thick growth of spruce, poplar, jackpine and birch, the last mentioned being a particularly noticeable and pleasing feature. Ideal camping spots graduating all the way from almost bare rock to dense bush, are abundant. Mr. Kitto has travelled a great deal, and it is his opinion that for natural beauty this lake surpasses anything he has ever seen, and is bound in the near future to be a Mecca for tourists. Besides, from a utilitarian standpoint, evidences are abundant that mineral deposits abound on its shores and islands. Already a number of claims have been staked out, but no development work has yet been done.

### Mandy Mine.

A particularly beautiful stream, known by the not particularly euphonious name of Schist Creek, is the connecting name of Schist Lake. A seven mile paddle on the centre of the three arms of this great lake brought the party to the Mandy Camp, noted for its mining and shipment of 3,600 tons of sulphide ore last winter. The makeshift and somewhat primitive machinery which was used in this work has been discarded, and new modern machinery installed in a large frame power house which is now almost completed.

A small stern wheel steamer and barge completed during the winter and spring are now plying the waters of Schist Lake in connection with these mining operations. Several other barges are in course of construction. The company has also installed and is now operating a saw mill a mile or so from the camp. Good spruce and poplar timber is available in the vicinity. The mill is in charge of Mr. George Cann. Mr. Donald Graham, accountant, and Mr. Kennedy, mine foreman, or "captain," took the visitors over the works, and down into the shaft, which is now to a depth of about 90 feet. After a little further sinking drifting will be commenced. The work throughout is progressing very satisfactorily, and augurs well for a big output of ore during the fall and winter months.

### Flin-Flon Lake.

Flin-Flon lake was the next point of attack. This necessitated a trip over the so-called trail "estimated" at four miles. Mr. Thomas Creighton received the visitors. Mr. John W. Callinan and Mrs. Callinan provided them with a real meal. Then they watched Supt. Scarfe and Zar. T. Crittenden sealing up numerous packages of crushed core for shipment to the authorities now conducting operations at that point; but information of an official nature as to the progress of the work and extent of the orebody uncovered was as scarce as the mosquitoes were numerous. However, it is a fair inference from general information gathered, that the two diamond drills now running night and day on the great sulphide property are showing up satisfactory results, both as to the extent of the orebody and quality of ore. It has been intimated that it is owing to scarcity of machinery and labor that additional drills are not now on the job.

### AN OKANAGAN MINING DEVELOPMENT CO.

The Penticton Herald, published in one of the most productive fruit-growing districts of British Columbia, says: The Penticton Development and Exploration Company is the name of a new enterprise recently launched here. The company has been formed by four well-known local men, Messrs. D. J. McIntyre, H. M. Ramsay, Art Thompson and W. J. Armstrong, with an authorized capital of \$25,000.

The company has been organized chiefly for the purpose of locating and developing mining properties in this vicinity, and it already has in view a number of promising properties near by, which will be thoroughly investigated, it will also afford encouragement to prospectors, and on a share basis will assist them in developing any claims that they shall find, if they are not in a position to do so themselves.

For many years it has been claimed by men who have made some study of mining matters that there are indications of valuable mineral deposits in this part of the Okanagan Valley, but until now very little prospecting has been done in the neighborhood. The new development company will likely have the effect of promoting a keener interest in local possibilities, as according to the promoters the day is not far distant when Penticton will be classed as another mining centre.

The local company has been founded on sound business principles, and no promotion stock has been or will be issued. A limited amount of the capital stock will be offered for public subscription.



## THE COAL TRADE OF NOVA SCOTIA DURING THE FIRST HALF OF 1917.

By F. W. Gray.

In a review of the coal trade of Nova Scotia for 1916 which appeared in the Journal in the issue of January 15th last, the writer estimated the production of coal in Nova Scotia during 1917 would not exceed 5,750,000 tons. During the past six months, however, the decline in outputs has been arrested by the cessation of recruiting at the collieries, and some additional production has been recorded from the smaller collieries which have recently been opened up, and it is gratifying to know that present indications are for a slightly larger production. It is probable the output for the year will reach 5,900,000 tons, and may even touch the figure of six million tons. This will compare with approximately 6,173,000 tons in 1916, so it may be closely estimated that the production of 1917 will be 200,000 tons below that of 1916.

As stated, the cessation of recruiting has arrested the long continued decline in outputs, and since last October production has been maintained at about the same level. The trade seems to be down to a war basis, and indications are that while no material increase in outputs is possible during the further duration of the war, the present rate of production can be maintained more or less indefinitely.

At a meeting of the coal operators of Nova Scotia called for the 13th and 14th July in Halifax by the newly appointed Fuel Controller, the operators were able to assure Mr. Magrath of their ability to take care of the fuel needs of the Maritime Provinces and Newfoundland, but this, together with the supplying of bunker requirements to naval vessels and transports, will exhaust the possibilities of the Nova Scotia coal tonnage during 1917, and will leave a quantity between 100,000 and 200,000 tons for forwarding to those markets in the St. Lawrence which formerly in normal years took up to 2,000,000 tons of Nova Scotia coal.

The operators undertook not to further increase the current maximum prices of coal at the pit mouth for consumption in the Maritime Provinces and Newfoundland. These current maximum prices are as follows:

F.o.b. mines per net ton.	Screened Coal.	Rummie.
Mainland collieries . . . . .	\$5.00	\$4.75

Cape Breton collieries . . .	\$4.75 to \$5.00	\$4.50 to \$4.75
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These prices are understood to apply so long as present conditions obtain, and any change in conditions necessitating an increase in selling prices is to be submitted to the Fuel Controller for his approval before any increase becomes effective.

It will be noted that the pit-month prices mentioned are quite moderate, and are very much less than the prices that the consumer has to pay for coal delivered at his works, or in his cellar. Herein is the application of the cost of transportation and distribution, which is largely beyond the control of the coal operators, but a comparison between pit-month prices and delivered prices serves to further emphasize the suggestion put forward by the writer in these columns several months ago, namely, that the coal operator, if he wishes to safeguard himself against uninformed public opinion and to really serve the public, should seek to control as much of the machinery of transportation and distribution as possible. Every person acquainted with coal mining operations knows the capital outlay, the planning and work of many individuals that must take place before it is possible to achieve even the smallest

economy in the cost per ton of mining coal. Thousands of dollars are cheerfully expended by the mining engineer to effect an economy which may be measured by a half cent per ton, and until the coal leaves the tracks at the pit mouth, economy and efficiency is the watchword of everyone concerned. But what happens afterwards? How much economy is there in the distribution of coal by half-ton lots in antiquated conveyances around the streets of a city? How much lost energy is there in re-screening coal to suit the whims of faddy customers, leaving an unsaleable residue of dust and slack? The energies of the coal operator stop short of the consumer, and it would be very much better in every way if they did not, both for the consumer and the operator, and with regard both to the quality of the coal and its ultimate price.

The first half of 1917 has seen a bewildering variety of changes in the local coal trade, and the coal operator is perforce acquiring an ability to adjust himself to changes in his environment that would have pleased Herbert Spencer, and should connote, according to that philosopher, the further ability to maintain the struggle for existence when peace arrives. The year commenced with the appointment of a Workmen's Compensation Board, and has been followed by the introduction of weekly pays in lieu of the long established system of fortnightly pays, and the appointment of a Fuel Controller. Whether it is the effect of the "wind from Russia" or is due to the general tautening of moral fibre that the war has occasioned, there has also been a laudable and partly successful attempt to "dry" the colliery and steel districts, and this attempt, small as it has been, has done more real good in improving social conditions than all the long list of paternal legislation that has descended upon us of late. The sale of liquor has actually been restricted, and more than anything else, this event has served to mark out 1917 as *annum mirabilis*.

In the memorandum handed by the operators to the Fuel Controller it was stated the recruits to the forces of the Empire and the Allies from the mines of Nova Scotia had been not less than six thousand men. The sacrifice of the miners is now being all too clearly borne out by the casualty lists. The number of men killed in action from the Glace Bay and Sydney districts alone now reaches almost 200, and there are visible reminders of the actuality of the war in the large number of wounded and returned soldiers to be seen on the streets of Sydney and Glace Bay.

It is therefore with good reason that the operators in addressing the Fuel Controller wrote: "We are of opinion, judging from experience during the war, that the men appreciate the position in like manner with the operators." The miners of Nova Scotia should receive the meed of praise that is their due. They have, as has been stated previously in these columns, given men and money to the war, freely and generously, and they have remained at work throughout the whole period of the war, in striking contrast to those men who in Western Canada and in other parts of the Empire have actually gone on strike in war time in the face of the appeals of the Government and even their own leaders.

We venture to state that this natural attitude of the miners of Nova Scotia is more typical of the working classes of our country than the attitude which might be imputed to them if full credence were to be given to so-called labor leaders like J. C. Watters and James



Simpson, men who purport to represent the workmen of Canada through the Trades and Labor Councils. The industrial masses of Canada most emphatically are **not** represented by the Trades and Labor Councils, and in a war of such import and magnitude as that in which we are engaged, the actions and sacrifices of the labor unionists of Canada are a far better guide to their patriotism than the seditious and shallow vapors of men who so totally and wantonly misrepresent them as do the leaders of the Trades and Labor Councils. The record of enlistment and service among the workers of Canada is a standing denial of the representations of these men, and an ever present rebuke to those who, in the guise of exponents of the workers' cause, seek to impute to the workers opinions and ideas they would be the first to repudiate.

### COPPER DEPOSITS WEST OF SUDBURY.

By Albert E. Hall.

Encouraged by the profitable development of great mineral deposits of nickel and copper at Sudbury there are always some men prospecting in the district, especially along the C.P.R. Soo branch which runs west from Sudbury to Sault Ste. Marie.

No nickel deposit of importance has been found, as far as is known, west of Worthington mine, which property is owned and operated by the Mond Nickel Co. However, there are some nickel prospects west of Worthington that a little work is being done on.

There are also a few gold claims, chiefly back of Espanola. The old Shakespeare gold mine, about four miles north of Webbwood, has been shut down for some years. They were sampled last year, but are idle at present.

By far the greatest number of claims are staked on chalcopryite showings. The most important of the copper propositions is Bruce Mines, which is operated by the Mond Nickel Company and the ore shipped to Coniston for its fluxing properties. This property has been operating for some years and very successfully.

Another property that is being developed is that of the Sudbury Copper Company, located at Iron Bridge, which is eight miles north of Dean Lake on the C.P.R.

Next in importance, but one which has had a more or less up-and-down career, is the old Massey mine. Several years ago this property was operated and the ore shipped to the smelter of the district. The property is fully equipped and the Elmore flotation system was installed in the mill. The property worked for a few years and was then closed down and nothing more was done till about two years ago when the Loble River Copper Company installed the Callow flotation cells. This company ran in debt and closed down and the Kenyon Copper Mines, Ltd., took it up and now controls the property. The mill is now about 100 ton capacity—24 hours. The property was operated last winter but the company ran behind in wages and closed down. However, it is reported that operations will start in the near future and this time on a basis that will insure permanent operations. This property is about three miles north of Massey.

Operations are also to be started in the Whiskey Lake district which is twenty miles north of Massey. At present a gang of men are working on the road into the lake and a launch has been put on the lake. Whiskey Lake caused quite a stir some years ago when some spectacular gold was found there. This, however, proved to be more or less spotty. Present operations are for copper.

Due to the fact that "Jack Wilson," the Dome prospector, lives in Massey and that the Massey mine is close by, nearly everybody in the district has been or is interested in some mining claims. Thus we find claims staked all over the district. Some of these are more or less promising. Two of the most promising are: The McCauley claim at Birch Creek, three miles northwest of Webbwood, where two good showings are to be seen where pits have been sunk that justify some work being done; and a claim six miles north of Webbwood owned by J. F. Flynn. There are many other claims, but the above is a summary of some of the promising ones.

Shut down at present are the Hermina mines which adjoin the Massey mine. The Hermina has an excellent mining equipment, but has no mill. It is reported to have some good ore, but is filled with water at present. Then there is the Cheney property back of Thesalon that was in the public eye last winter.

All these properties have chalcopryite for their dependent ore. It runs from 1.5 per cent. to 3 per cent. It occurs in veins from 3 to 6 feet wide that are often faulted and brecciated, occurring with schist and quartz. These when treated by flotation will give as high as 22 per cent. concentrates.

History is against the district and though the price of copper remains high, men are very scarce except at the larger Sudbury mines. Even they are in need of a good many men.

### PERSONAL

Dr. Frank D. Adams is at Banff, Alberta.

Mr. A. D. Miles has returned to Copper Cliff from New York.

Mr. W. E. Segsworth, who is interested in the industrial training of returned soldiers, will shortly visit industrial centres in the Maritime Provinces.

Mr. W. R. Wilson, of Fernie, B.C., general manager for the Crow's Nest Pass Coal Company, Ltd., recently paid a business visit to the company's headquarters in Toronto.

Mr. Chas. F. Law, of Vancouver, B.C., for many years interested in placer-gold and platinum claims in British Columbia, has again been spending a few days on the Tulameen river where he still holds placer-mining interests.

Mr. M. E. Purcell, formerly superintendent of the Consolidated Mining and Smelting Co.'s Centre Star-War Eagle group of mines at Rossland, B.C., has gone on a trip to Southeast Alaska in the interests of the Consolidated Co.

Mr. A. W. McCune, of Salt Lake City, Utah, who is a periodical visitor to Ainsworth and Shocan mining divisions of British Columbia, in which he is developing several mining properties, recently donated \$25,000 to the funds of the American Red Cross.

Mr. Geo. R. Rogers has returned to Toronto from West Shiningtree, where he has laid out work for sinking a shaft on the Ribble vein on the Wasapika Gold Mines property.

Mr. W. M. Brewer has been appointed district mining engineer of the Western mineral survey district, B.C., and Mr. D. B. Fredland, district engineer for District No. 4, with headquarters at Grand Forks.

Lieut. W. M. Goodwin, of the Canadian Engineers, has been awarded the Military Cross. Lieut. Goodwin is a son of Dean W. L. Goodwin of Queen's University, Kingston.



## SPECIAL CORRESPONDENCE

### NORTHERN ONTARIO.

#### New Vein at Hollinger.

A new vein twelve feet in width was encountered a few days ago at the 410-foot level of the No. 10 shaft of the Hollinger mine at Porcupine, and as the average gold content is understood to be high, it will prove a valuable addition to the already large ore reserve at this mine. Free gold was in evidence in many places on the vein. A crosscut is now being driven to make the new orebody more accessible to the central shaft. This is in accordance with the management's plan to centralize the underground workings as much as possible, which will also help materially in reducing the costs of mining operations. When the network of underground workings is systematically connected up and the milling facilities increased and pressed into service at their full capacity, the lowest mining and milling costs in the history of the company will probably be recorded.

With additions to the ore reserves at the rate lately maintained and drawing only a limited amount for treatment in the mill, it is anticipated that the end of the current year will show the ore reserves to have an estimated value of nearly forty million dollars. The deficit accumulated when sufficient labor could not be obtained to work the property sufficiently to meet these disbursements is almost completely wiped out, and it will only be a short time until a handsome surplus should be built up.

Generally speaking, conditions at the Hollinger show much improvement during the past couple of months, and with a return to pre-war conditions much is predicted for this, the largest gold mine in the Dominion.

#### Diamond Drilling on Davidson.

Diamond drilling has been going forward rapidly lately at the Davidson property in Porcupine, and at the 500-foot level, an orebody 32 feet in width of high grade has been encountered. Four other holes were sunk from the 200-foot level and two of them located very promising orebodies. The cores from these last four holes are now in the hands of the assayers and the results are being awaited with a great deal of interest by those connected with the company. Since the new management took over the property some fifteen months ago, over half a mile of drifting and crosscutting has opened up extensive orebodies located previous to that time, and a large tonnage of ore has been put in sight. However, only a small portion of the known orebodies have been opened up, and Davidson is looked upon with a good deal of favor in the camp.

#### Shaft Started on Whelpdale.

A shaft has been started on the Whelpdale Vet, and will be sunk to the 100-foot level. Drifting will be done both north and south at that point. Considerable prospecting has been done lately on this property. Eight men have been engaged in stripping and trenching for the past month, and four new veins have been discovered in addition to the six previously located. These veins have all been uncovered for five or six hundred feet and look very promising. This veteran claim lies west of the Gold Ridge property and is on the north of Gillies Lake.

#### Prospecting Lucky Baldwin.

Crosscutting was started last week from the 100-foot level of the Lucky Baldwin property at Kenogami. It is not anticipated that much crosscutting will be neces-

sary to cut the vein as it was almost perpendicular, the shaft having followed it for over thirty feet from the surface. The vein is in a contact of porphyry and Kewatin formation and has been traced for about four hundred yards on the surface. The porphyry and conglomerate formations are somewhat similar to those encountered at Kirkland Lake.

#### Good Ore on Jupiter.

The main working at the 1,000-foot level of the McIntyre mine at Porcupine, which is already over 1,100 feet in length has entered the Jupiter ground, having crossed the territory formerly known as the McIntyre Extension. At a point about twenty feet from the boundary of the Jupiter, the drift was said to be 52 feet wide of high grade mill ore. At the Jupiter line this orebody widened out to 52 feet and is now reported to be 55 feet in width and of a grade considerably above the average of the mine, which has been around \$12.50 to the ton.

#### Murray-Mogridge.

It is anticipated that the 200-foot level of the Murray-Mogridge will be reached before the end of the current month. The south shaft of the property which is located at Wolfe Lake, near Bourke's Siding, on the T. & N. O., is now down below the 100-foot level. The vein is continuing consistently in width and values.

#### Prospecting in Thackeray.

Prospecting work in the township of Thackeray is opening up some promising looking veins. The rock formation in the district is very similar to that of the Kirkland Lake camp, and the composition of the veins bears more or less resemblance to those located in that district also. So far nothing very spectacular has been reported.

#### Nickel Ore Shipments from Alexo.

During the month of June the Alexo Nickel Company shipped ten car loads of ore from their property near Porquis Junction. The weight of the ten cars was approximately \$46,800 pounds, and compared very favorably with the amount sent out during the preceding few months.

#### Rich Ore Shipped from Gowganda.

During the months of May and June the Miller Lake-O'Brien mine at Gowganda shipped silver ore to the extent of 211,000 pounds, which required four cars for shipping. The last shipment was made on June 27th. The ore being mined at this property is among the richest in the north country silver mines at the present time and is coming from the high grade ore shoot developed about eleven months ago.

The result of this development at the Miller Lake-O'Brien was to increase activity in the Gowganda district to a considerable extent, and a number of properties are being worked at the present time with more or less vigor. About eighty men are employed at the property.

#### Croesus Adds Pumps.

As a result of a water seam being encountered at the lower workings of the Croesus mine in Munro township a considerable amount of water has come into the mine causing the suspension of work on these levels. Additional pumps are being installed and it is expected the trouble will be remedied in a short time. The new fifty-ton mill is in operation and is understood to be treating almost to capacity, with the mill heads maintaining around forty dollars to the ton—the highest of any mine working in the north country.



**Boston Creek.**

It is reported that operations at the Boston Creek Mine have been suspended pending re-adjustment of agreements with the R. A. P. Syndicate. The Boston Creek company have heretofore used the shaft of the R. A. P. Syndicate for development purposes. The winze in the Boston Creek has reached a depth of nearly 500 feet and it is said that the results being obtained are very encouraging. The vein continues comparatively strong with considerable high grade ore in the pay streak. At one of the upper levels crosscutting operations were also being conducted. It is understood that the suspension of work is only temporary.

**Hunton-Kirkland.**

A new vein nearly four feet in width has been uncovered for a considerable distance on the Hunton-Kirkland property and has been found to contain good average gold values. It is learned on good authority that a deal is pending for the amalgamation of the Orr and the Hunton-Kirkland property. It is understood that the main vein of the Teek-Hughes and the Kirkland Lake Gold crosses the northwest portion of the Orr claims. Official announcement of the amalgamation will be made in the course of a few days.

**Elliott-Kirkland Will Instal Steam Plant.**

At the 165-foot level of the Elliott-Kirkland a water seam has been encountered, and for the time being it has been decided to discontinue underground work. The water is not coming in very rapidly, but the size of the plant will not permit of the operation of the necessary equipment being added to handle this trouble, and a small steam plant will be installed. The electric equipment will then be used to run the drills, and the small steam plant will take care of the pumping and hoisting, in the meantime the electric equipment will be used to keep the shaft pumped out. It is expected that sinking will again be resumed the first week in August.

**Charette.**

Surface work on the Charette claims about the centre of Boston township is said to have uncovered very promising veins carrying free gold and tellurides. The veins have been traced for a considerable distance and vary in width from ten inches to three feet.

**Teek-Hughes to Increase Milling Capacity.**

The mill report of the Teek-Hughes mine at Kirkland Lake for the month of June shows that the mill treated 1,260 tons of ore, with an average value of \$9.66 per ton, which is considerably higher grade than that treated during April and May. Shortage of labor helped to curtail the production to a certain extent.

The main shaft at the property is to be sunk to the 600-foot level at once and the various veins which have been very persistent both in values and width from the surface to the 400-foot level will be tapped at the 600. At the same time it is the intention of the management to increase the capacity of the mill another 75 tons, which will bring the tonnage available up to around 150 tons per day. It is anticipated that a considerable reserve will be piled up by the time the mill addition is completed. At the present time the ore going to the mill is all coming from development work and the values are not as high as would be the case were the ore coming from the bodies now known to exist in the mine. The veins on the Teek-Hughes vary from a few feet to over thirty feet in width at the 400-foot level.

**Buffalo Interests in Boston Creek.**

It is understood that interests closely associated with the Buffalo mines of Cobalt have taken over a group of claims in McElroy township of the Boston Creek district. These claims formerly belonged to Messrs. Mondean, Briseboise, Phirlbert, et al., and comprise over a dozen claims situated on the east of the Boston Gold Leaf property, near the old winter road to Larder City. Considerable surface work has been done and a number of promising veins have been opened up. Free gold has been found and assays taken are reported to have proven very satisfactory. The claims are located about three miles from Boston Creek station.

**Kirkland Lake Gold to Instal Ball Mill.**

Nearly one year's ore reserves for a 150-ton mill are now in sight at the Kirkland Lake Gold property. The ore reserves of the mine show a steady increase. Already approximately 50,000 tons of ore ranging in value from \$10 to \$12 a ton has been blocked out and a quantity of it has already been conveyed to the dumps. Arrangements have been concluded for the installation of a ball mill of a capacity of 150 tons per day, which it is anticipated will be in operation by the spring of 1918.

The main shaft has now reached a depth of 700 feet and crosscutting has been commenced to tap the vein at this level. At the 600-foot level indications pointed to the vein having gone considerably below the conglomerate formation and the fact that values continued satisfactory is considered as evidence that the mine is destined to be a deep mining proposition.

**Canadian Kirkland.**

Twelve veins have been uncovered on the Canadian Kirkland property, which is situated a quarter of a mile west of the Hunton and a little south from the Elliott Kirkland. One of the latest veins opened up is of a blue-grey quartz and highly mineralized. A small force of men has been employed on the property for about three months, and the results obtained to date are considered very encouraging.

**Wright-Hargraves.**

Work at the Wright-Hargraves property in Kirkland Lake is again in full swing, and No. 2 shaft is now down to the 200-foot level. A station will be cut at this point and the vein tapped, after which the shaft will be continued to the 300-foot level. At the latter depth a large station will be cut and drifting will be commenced to connect the No. 2 and No. 3 workings, which are separated by a distance of nearly 900 feet. On the surface the main vein of the Hargraves is about 12 feet in width and carries ore of a high grade milling value, which was also determined to persist to the 100-foot level, which has been reached in both the No. 2 and No. 3 shafts.

**Large Production at Nipissing.**

The Nipissing mining company's production for the month of June was the highest since February last. In his regular monthly report to the directors and shareholders, Mr. Hugh Park, manager, states that during the month of June the company mined ore of an estimated value of \$269,469 and shipped bullion and residue from Nipissing and customs ore of an estimated net value of \$475,329. The high grade mill treated 136 tons and shipped 567,409 fine ounces of silver. The low grade mill treated 6,252 tons. The following is an estimate of the production for the month of June:—Washing plant, \$176,670, low grade mill, \$92,799, total,



\$269,469. The total for the half year ending June 30th, amounts to 1,492,677 ounces and the average per month during the current year was 243,779.50 ounces.

The usual amount of development and exploration work was done in the various shafts, and the several small veins were encountered. With the exception of one which will produce a small amount of high grade they are of interest and value at their present stage of development for the small amount of mill ore that may be obtained from them. Ore is now being stoped from the 6th level of vein 490 and it is expected that the future monthly production will be obtained largely from this vein, but no other ore shoots have been found as yet. The condition of all the stopes on the various veins continues to be satisfactory.

#### Casey-Cobalt.

Reports from the Casey-Cobalt mine in the township of Casey to the northeast of New Liskeard are to the effect that good results are being obtained from the limited amount of operations being conducted on the property. The ore reserves of the mine are understood to be quite large and prior to the disastrous fire of a year ago, when the equipment of the mine was completely destroyed, the Casey-Cobalt was a steady shipper.

#### The Adanac Discovery.

The vein recently discovered at the 310-foot level of the Adanac mine at Cobalt is understood to be standing the test of development very well and has widened out to upwards of eighteen inches. At the point where encountered the vein had a width of about four inches, but as drifting continued this widened out to the former mentioned width, and the values are said to be very consistent. The ore being bagged shows considerable native silver. The work at the Adanac since the commencement of the current year has been done under contract.

#### Buffalo.

For the past year ended June 30th last the report of the Buffalo Mines, Limited, shows a gross income of \$306,465; total expenditures of \$339,882 and net income \$36,583. The balance sheet as of April 30th last, shows ore and cash and bullion of \$839,229. A surplus of \$669,177 and total assets and liabilities of \$2,018,004. The total production of silver for the year, including concentrates, etc., on hand and at the smelter amounted to 304,587 ounces. During the year the mill treated 14,452 tons of ore from the mine by a combination concentration and oil flotation process. There is broken ready for hoisting approximately 15,700 tons of ore in the stopes of an approximate value of 25 ounces per ton; unbroken ore developed 17,000 tons of the same estimated value, or 951,125 ounces. There is 8,000 tons of ore on the dumps of an approximate value of 120,000 ounces, making a total of 1,071,000 ounces. Sand tailings of approximately 275,000 tons remain of an estimated value of 1,400,000 ounces, also 3,000 tons of residue at the high grade plant for further treatment. "As soon as a steady production of the plant of an estimated capacity is assured, the directors will determine the amount advisable to distribute to the shareholders."

#### Temiskaming.

Temiskaming mining company's half-yearly report shows cash on hand of \$343,135, as compared with \$275,817 on hand six months ago. Silver on hand amounts to 320,667 ounces. A little high grade is still in place

near the north boundary. There is 8,400 tons of ore broken on the stulls of which twenty ton is 4,000 ounce ore. Prospecting is being continued at the 1,600-foot level in an endeavor to locate values at this depth. During the past three years considerable mill rock has been taken from the old workings and according to the report it looks as though this part of the mine had been thoroughly cleared up. Development work on the Gans lot has been most thorough, but up to the present has not been productive of good results.

#### Hudson Bay.

Mill troubles at the Hudson Bay Mine in Cobalt was largely responsible for the falling off of production at the plant for the month of June, some ten days were lost in making repairs. The production amounted to 28,000 ounces.

#### Chambers-Ferland.

While at work digging an excavation for sewers on Earle Street, Cobalt, on the property of the Chambers-Ferland mining company, a comparatively strong vein containing niccolite and a small amount of native silver was discovered. Sufficient development work has not yet been done on the vein to determine its value to the Cobalt Aladdin Mining Company, who now own the Chambers-Ferland property.

#### Labor Troubles Settled.

The labor troubles have been amicably settled for the time being in the mining district of Northern Ontario. It was announced at a public meeting on Sunday night that it had been decided not to strike at the present time as the scale of wages being paid was in some cases higher than that demanded when the strike vote was taken. The executive committee announced that it would not be necessary to take another strike vote of the members of the union should they decide to call the men out at a later date, when they seemed to fear that with the reduction of the cost of living there would also be a reduction of the present wage scale.

There are very few men in the Cobalt mining camp to-day who are making less than \$3.50 per day, and underground men at the Hollinger mine are now receiving a minimum wage of \$4 per day, while all other classes of mine and mill men received a raise in wages of approximately 50 cents per day in the form of a bonus.

It is considered that the labor troubles throughout the district are at an end for the time being, and the supply of labor is daily becoming more normal. Men who feared the possibility of labor troubles and were going elsewhere, are returning to the north where conditions are as good as any place in the Dominion at the present time.

#### BRITISH COLUMBIA.

An additional dividend disbursement to those advised two weeks ago are those of the Standard Silver-Lead Mining Co., of 5 per cent., total \$100,000 payable July 15th, and of the Granby Consolidated M. S. & P. Company, of 2½ per cent., payable August 1st., total of this profit distribution being \$374,963.

Settlement of the coal mine employees' strike in Crowsnest district in Southeast Kootenay, and in Alberta, now seems to be within measurable distance. The appointment by the Dominion Government of Mr. W. H. Armstrong, of Vancouver, B.C., with power to arrange for a resumption of work in the coal mines, makes



it reasonable to look for prompt action to break the deadlock that has existed for several months.

#### East Kootenay.

While the two or three small shippers that added their output to the very much larger production of the Sullivan mine in May were not on the list of those mines from which ore was received at the smelting works at Trail during the three weeks ended June 21st, the daily average was increased from 348 tons a day for May to 370 tons a day for June. The St. Eugene, in Fort Steele division, and Paradise, in Windermere division, were two of the small producers referred to.

#### West Kootenay.

**Ainsworth.**—There has been an increase in ore production from mines in Ainsworth division, or rather in the quantity of ore received at Trail therefrom. The Bluebell is steadily maintaining its output of lead ore; the Florence Silver Mining Co. recently shipped 100 tons of silver-lead concentrate following several weeks' operation of its new concentrating mill; the lessees of the Retallaek & Co. mines at Whitewater shipped 146 tons. Further improvement in a similar direction is looked for, prospective producers in the near future being the Silver Hoard, Cork-Provence, Utica, Bell, and others that for one reason or another have not lately been on the shipping list.

**Slocan.**—In this division, too, there should soon be a marked increase in production, for with the snow gone roads and trails will shortly be fit for ore hauling or packing, and there is now plenty of water for power and concentration uses. Beside, it is expected that suitable arrangements will soon have been made for treatment of zinc ore from the Lucky Jim mine, the output of which has been small through the winter.

**Nelson.**—In addition to the new find of zinc ore at the Hudson Bay mine, Salmo, already communicated to the Journal, there is news of an improvement at the Granite-Poorman gold mines, near Nelson, a recent report from which told of a recovery of gold and concentrate together worth \$5,000, from a short mill run.

**Rossland and Trail.**—After a suspension of production that extended over about two months, shipment of ore from the Consolidated Mining and Smelting Company's Centre Star group of mines, in Rossland camp, has been resumed. The output, though, appears to be restricted to ore taken out in the course of doing development work, for receipts from this source at the company's smelting works at Trail were only 263 tons during the week ended June 11th and 564 tons in that ended 21st. Under normal conditions Centre Star output has been very much larger; for nine months ended October 31st, 1916, the total was 138,986 tons, an average of 3,564 tons a week, so it is evident that ore stoping is not now being done, production being so very much smaller, notwithstanding that there are large reserves of ore available. As soon as the copper furnaces at Trail shall again be blown in, a considerably larger output of ore from the company's Rossland mines may be looked for.

The report of the Josie mine, Rossland, for the month of April has been received and made public by the London office of the Le Roi No. 2, Limited, which company's managers at Rossland reported as follows: No ore was shipped. The receipts from the smelting works at Trail, on account of ore shipped in March, were \$6,009 in payment for 508 tons; sundry receipts, including \$1,173 refund in respect of explosives, were \$1,201; total receipts, \$7,213. Estimated working costs for the month were, for ore production \$5,980, and for

development, including diamond-drilling, \$2,720; total, \$8,700. An office note states that shipment of ore, which was suspended about March 31st, is about to be resumed. The published statements of receipts at Trail do not, however, to June 21st, show that this expectation had by then been realized.

Ore receipts at the Consolidated Co.'s smelting works at Trail during the week ended June 21st, totalled 5,102 tons, as compared with 3,852 tons for the week ended June 14th, and 3,749 tons for that ended June 7th. The districts or mining divisions from which ore was received during the week ended June 21st were as follows: From Fort Steel division of East Kootenay, 2,791 tons. From West Kootenay district: Ainsworth division, 403 tons; Slocan division, 646 tons; Nelson division, 73 tons; Trail Creek (Rossland) division, 564 tons. From Boundary district: Greenwood division, 508 tons. From Troy, Idaho, U.S.A., 117 tons. The larger shippers were the Consolidated Co.'s mines, the Sullivan having shipped 2,791 tons, the Centre Star 564 tons and the Emma 508 tons. The Standard mine, near Silverton, Slocan Lake, shipped 415 tons. The total of receipts for the current year, to June 21st, inclusive, is 176,067 tons, of which quantity 126,123 tons came from the company's mines and 48,944 tons was of custom ores.

There has been a decided falling off in the quantity of ore received at the Consolidated Co.'s smeltery from the United States. During four weeks ended June 21st, the total was only 516 tons, as compared with 2,360 tons during four weeks ended May 21st. Earlier in the year the receipts were still larger than in May. One reason is that the copper furnaces at Trail have been inoperative for some time, owing to the available supply of coke being too small to admit of their being operated. Then there has been a diversion of some custom ore to the smelting works at Northport, Washington, past which all ore coming from Washington mines has to be hauled to reach Trail. One instance of such diversion is that of ore from the Hercules mine, in the Coeur d'Alene district of Idaho, from which mine 2,112 tons of ore was received at Trail in February and March, while not any reached Trail from that mine during the last three months.

#### Vancouver Island.

A resident of Victoria who recently made a trip to the west coast of Vancouver Island, included in his notes of what he saw, published in the Daily Colonist, Victoria, the following concerning mining properties in Quatsino division, in the northwestern part of Vancouver Island:

"At Yreka the old camp looks decidedly lively once more and from all information obtainable there is every appearance of its staying this time, the large bodies of ore now uncovered and blocked out seeming to justify expectation of a good future for the camp. A large new ore bunker, just east of the old sawmill site, is about finished and the superintendent, Mr. N. A. Clark, informed me that they would be ready in a day or two to try out the new aerial tramway, and be expected to have a load of ore ready for shipment in about a week or ten days. The ore is copper sulphide and some of it runs as high as ten per cent copper."

Three miles farther up this arm of Quatsino Sound we stopped at June Landing, which is the saltwater terminus for the Elk Lake and Lumsden properties. Here we put off from the steamer lots of freight which is packed in on horse about seven miles to Alice Lake,



then it is taken across the lake in a launch, then there is packing again for three miles, to Kathleen Lake, and thence is taken by boat to the end of a short trail from the Old Sport group mining camp to the lake, the total distance from June Landing to the camp being about twenty miles. This is an active camp, under the superintendence of Mr. William Clancy. They have there a compressor plant driven by water-power, and they are down 400 feet on the ore. The plan is to do a lot of development work before undertaking the construction of a railway to tidewater and the provision of smelting facilities. Along the shore was seen the recently completed Dominion telephone line."

To the foregoing notes may be added the following excerpt from the official "Preliminary Review," for 1916, published by the Provincial Department of Mines: The Old Sport group of mineral claims was acquired by a company subsidiary to the Consolidated Mining & Smelting Co., of Trail, and further development work was commenced on September 1st under the superintendence of Mr. William Clancy, who had previously prospected the property for the Quatsino Copper Co. with diamond-drill, long crosscut adit, and trenches every 50 feet, for a total length of 3,000 feet, along the length of the orebody.

#### Portland Canal.

A report concerning the Outsiders' group, Maple bay, Portland Canal mining division, printed recently at Prince Rupert, is that a Mr. Drumheller had gone thence to Maple bay with the intention of doing further development work on the Outsiders' group. About ten years ago the Outsiders' mine was a producer of copper ore, and shipped a considerable quantity of it to the Brown-Alaska Company's smeltery at Hadley, Prince of Wales Island, Southeast Alaska.

The preliminary work of getting the camp buildings and surface works generally into good order is being proceeded with. The expectation is that when mining shall be undertaken the working force will be increased to about sixty men. About 2,000 feet of work was done when the mine was being operated years ago, so that there is not nearly so much development required as would be the case were the property not developed at all. Supplies in considerable quantity are being shipped in, the purpose being to do a lot of mining this summer.

#### General Notes.

Employees of the Vancouver-Nanaimo Coal Mining Co., operating the Jingle Pot mine, near Nanaimo, Vancouver Island, have been granted an increase of ten per cent. in wages, effective immediately.

Four groups of mineral claims, situated near the head of Seymour arm, Shuswap lake, Kamloops mining division, are now being worked. A diamond drill was recently taken from Kamloops to this field, which, it is hoped, will be developed into a permanent mining camp.

A syndicate of Vancouver men is reported to have bonded a group of mineral claims in Aspen Grove camp, Nicola mining division. The first work to be undertaken after establishing camp, is to dewater two prospect shafts, one 65 and the other 80 feet in depth. It is intended to employ about twenty men doing development work. Mr. Robert R. Hedley will be in charge.

The Granby Consolidated Co.'s copper production at its Anvox smelting works, Observatory Inlet, during May was 3,159,284 lb., as compared with 3,026,795 in April and 2,814,780 in March. There was not any pro-

duction of copper at the company's plant at Grand Forks, in Boundary district, in May, but in April the output from that smeltery was 784,348 lb., and in March 1,086,618 lb.

#### Cariboo.

Correspondence from Barkerville, published in the Cariboo Observer, Quesnel, includes the news that although the hydraulicking season is not yet half over, several of the hydraulic placer gold mines have had satisfactory clean-ups, especially Mosquito creek, which is again producing splendidly this year.

The same newspaper also gives the information that Mr. S. J. March, who is manager for the company which recently purchased the Killam mining properties at Cottonwood mouth, has returned from a month's visit to Denver, Colorado, and the coast cities, where he had been for the purpose of purchasing machinery for the effective development of the above-mentioned mining property.

Messrs. L. A. Borde and J. Blake, engineer, arrived in Quesnel, from Victoria, last month. They came in connection with the operation of the plant owned by the International Dredging and Exploration Company.

#### West Kootenay.

Mining in this district is in a progressive condition, and it is hoped that nothing more will occur this year to prevent production being made on a larger scale than has been practicable since the Crowsnest coal mine employees went out on strike several months ago. There has been some talk of the miners in Sloean and Ainsworth divisions stopping work unless higher wages were paid to them, but up to the present no decision to strike appears to have been arrived at, although the matter has been discussed at meetings of local Miners' Unions.

**Ore Receipts at Trail.**—Notwithstanding that conditions were not quite favorable to shipment of ore to Trail in June, it was pleasing to find that in that month ore was received from six mines in Ainsworth division and seven in Sloean, the month's total of receipts of ore and concentrate at the Consolidated Mining and Smelting Company's works from those two divisions having been 2,915 tons, of which 1,917 tons was from Sloean mines and 998 tons from those of Ainsworth division. The Sloean mines that contributed to the total were the Galena Farm, Hewitt, Lucky Thought and Standard, in the neighborhood of Silverton; the Sloean Star and Surprise, situated near Sandon; and the Rambler-Cariboo, three or four miles east of Three Forks. The mines in Ainsworth division that shipped to Trail in June were the Bluebell, on the east shore of Kootenay lake; the Banker-Maestro, Highland and Florence, in the neighborhood of the town of Ainsworth; and the Retallack & Co. property in what was formerly known as Whitewater camp.

The total of ore receipts at Trail from all sources in June was 17,129 tons, which compares with 42,249 tons for the month of June in 1916. This considerable decrease was largely the result of the stoppage of the supply of coke from the Crowsnest district of Southeast Kootenay. The proportions of total of receipts in that month from the various districts and mining divisions were as follows: East Kootenay district: Fort Steele mining division, nearly all from the company's Sullivan lead-zinc mine, 9,823 tons. West Kootenay district: Ainsworth division, 998 tons; Sloean division, 1,917 tons; Nelson division, 302 tons; Trail Creek (Rossland) division, 994 tons; Trout Lake division, 39 tons.



Boundary district: Greenwood division, nearly all from the Consolidated Company's Emma copper mine, 2,254 tons. Yale district: Nicola division, 36 tons. Province of Manitoba, 323 tons. United States: Washington, 83 tons; Montana, 360 tons.

Now that work has been resumed at the Crowsnest coal mines, it is to be expected that receipts of ore at Trail will be in gradually increasing quantities until they shall again become about normal.

#### Coast.

The British Columbia Mining News, published in Vancouver, has printed the following information relative to two mining properties situated on Howe Sound in Vancouver mining division.

"Some interesting ore samples have been recently brought to Vancouver from the Paystreak group of claims on Howe Sound by the owners, Messrs. J. B. Edwards and W. C. Savage. The property is an old abandoned location which was re-located in the spring of this year by Mr. Edwards. Not enough work has been done to determine the value or extent of the mineral deposit, but an assay made in Vancouver of picked ore shows results as follows: Gold \$1 and silver 4.5 oz. to the ton; copper, 12.33 per cent.; giving a total value with metals priced as they were when the assay was made, of \$83.23 a ton. The property extends back from tidewater, and is only twelve miles from Vancouver. When ore is shipped it can be loaded directly from the shaft or tunnel mouth onto scows.

"Through Messrs. Cowan, Ritchie & Grant, of Vancouver, a syndicate composed of New York and Boston capitalists has made an offer to purchase the Bowena copper mine, and a meeting of shareholders of the company was called to vote on the proposition. The offer is \$200,000 on terms extending over a year, and if accepted will net shareholders 80 cents a share. The shareholders agreed on the price and negotiations are now proceeding as to terms of payment. The Bowena is situated on Bowen island, 14 miles from Vancouver, and a considerable amount of development work has been done and several shipments of ore made, the last of which went to the Ladysmith smelter, being Lot No. 5 received by that institution. The net dry weight of that lot of ore was 19,602 pounds. Assay returns were as follows: Copper, 3.38 per cent.; gold, 9.12 oz., and silver, 1.16 oz. to the ton; iron, 3.37 per cent.; silica, 70.65 per cent.; lime, 1.15 per cent.; sulphur, 6.45 per cent. Total value, \$19.18, and treatment charges, \$5 a ton.

**Vancouver Island.**—The Blue Grouse copper mine, situated near Cowichan lake, is being operated by Messrs. Kitchen, Miller and others of Victoria, under a lease and option of purchase, according to a provincial publication. Up to date two shipments of ore have been made. The first was made by Messrs. Palmer and Kier, who were operating the mine on a royalty basis; they sacked and shipped to Trail 37 tons of ore and realized a profit of \$1,815. The assay of this ore was: Copper, 11.7 per cent.; iron, 22.4 per cent.; gold, 0.8 oz., and silver 4 oz. to the ton; silica, 36.4 per cent.; lime, 14.2 per cent.; alumina, 8.4 per cent., and sulphur, 12.9 per cent. Another shipment was made in March to the smelting works at Ladysmith; this consisted of 855 sacks, about 70 tons, and probably realized more than \$1,000 profit.

The ore occurs in large lenses of irregular shape and size, and at some distance from the intrusive grano-

diorite. These lenses occur in the Sutton limestone, which are lenses in the Vancouver volcanics. The copper ore occurs as chalcopyrite, being associated with pyrrhotite, pyrite, and magnetite, and it is a replacement deposit. Many inclusions of country rock in the orebody occur. The country rock is much sheared and slickensided. The development and exploitation is by a high-level tunnel and by open-cut.

From The Prince Rupert Daily News it is learned that Mr. Drumheller, who had been in Prince Rupert for several days past, has gone to Maple Bay, Portland canal, where he intends going ahead with the further development of the old Outsider mine there. This mine was a producer ten years ago, shipping its ore to the Brown-Alaska Company's smelter at Hadley, Prince of Wales Island, Southeast Alaska; recently there has been a change of ownership. The preliminary work of getting the camp buildings and surface erections in shape is proceeding, quite a few men being employed, and before long when actual mining operations shall be under way, it is expected that this mine will employ about 60 men. There is already about 2,000 feet of underground work done, so there should not be so much preliminary work required as there would be in the case of a new mine. Large quantities of supplies are being shipped in, in expectation of a long summer's work.

H. C. Hoover has been awarded the Cross of a Commander of the Legion of Honor by the French government in recognition of his services in provisioning Belgium and northern France.

#### SILVER PRICES.

		New York. cents.	London. pence.
July 6	.....	78 3/4	39 1/2
" 7	.....	78 1/4	39 3/4
" 9	.....	78 3/4	39 1/8
" 10	.....	79 1/2	40 3/8
" 11	.....	80	40 5/8
" 12	.....	80 1/4	40 3/4
" 13	.....	80 3/4	41
" 14	.....	79 3/4	40 1/4
" 16	.....	81 1/4	41 1/4
" 17	.....	80 5/8	40 1/2
" 18	.....	80 1/4	40 3/4
" 19	.....	79 1/2	40 3/8
" 20	.....	78 5/8	39 1/2
" 23	.....	78 5/8	39 7/8

#### TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.
Cobalt oxide, grey, \$1.65 per lb.
Cobalt metal, \$2.25 per lb.
Nickel metal, 45 to 50 cents per lb.
White arsenic, 15 cents per lb.
July 26, 1917—(Quotations from Canada Metal Co., Toronto)
Spelter, 12 1/2 cents per lb.
Lead, 13 cents per lb.
Tin, 63 cents per lb.
Antimony, 18 cents per lb.
Copper, casting, 34 cents per lb.
Electrolytic, 36 cents per lb.
Ingot brass yellow, 23 cent.; red, 25 1/2 cents per lb.
July 26, 1917—(Quotations from Elko Rogers Co., Toronto)
Coal, anthracite, \$9.50 per ton.
Coal, bituminous, nominal \$9.00



## MARKETS

## NEW YORK MARKETS.

## Connellsville Coke—

Furnace, spot, \$11.50 to \$12.00.

Furnace, contract, nominal.

Foundry, spot, \$12.50 to \$13.50.

Foundry, contract, nominal.

Straits Tin, spot, f.o.b., 62.50 cents.

## Copper—

Prime Lake, nominal, 28.00 to 29.00 cents.

Electrolytic, nominal, 26.25 to 26.75 cents.

Casting, nominal, 25.00 to 25.50.

Lead, Trust price, 11.00 cents.

Lead, outside, nominal, 10.00 to 10.25 cents.

Spelter, prompt western shipment, 8.55 to 8.67½ cents.

Antimony—Chinese and Japanese, nominal, 15.00 cents.

## Aluminum—nominal.

No. 1 Virgin 98-99 per cent., 53.00 to 55.00 cents.

Pure, 98-99 per cent. remelt., 51.00 to 53.00 cents.

No. 12 alloy remelt, 38.00 to 40.00 cents.

Powdered aluminum, 75.00 to 85.00 cents.

Metallic magnesium—99 per cent. plus, \$2.00 to \$2.50.

Nickel—Shot and ingot, 50.00 cents.

Electrolytic, 55.00 cents.

Cadmium, nominal, \$1.45 to \$1.50.

Quicksilver (July shipment from California), \$115.00.

Platinum—Pure, \$105.00.

10 per cent. Iridium, \$111.00.

Cobalt (metallic), \$2.70.

## Tungsten—

Wolframite, \$22.00 to \$23.00.

Scheelite, \$26.00.

Silver (official), 78½ cents.

Metal Products.—Following quotations represent mill prices and are strictly nominal except in the case of lead sheets and sheet zinc:

## Sheet Copper—

Hot rolled, 38.00 to 40.00 cents.

Cold rolled, 39.00 to 41.00 cents.

(Shipments from stock 2c per pound extra.)

## STANDARD STOCK EXCHANGE.

(As of close, July 26.)

## Silver.

	Asked.	Bid.
Adanac .....	.16	.15½
Bailey .....	.04	.03½
Beaver Consolidated .....	.35	.33
Chambers-Ferland .....	.15	.14
Coniagas .....	...	3.55
Crown Reserve .....	.30	...
Foster .....	.05	...
Gifford .....	.04¼	.03½
Great Northern .....	.07¼	.07
Hargreaves .....	...	.11½
Hudson Bay .....	40.00	38.00
Kerr Lake .....	5.00	4.90
La Rose .....	.48	.46
Lorrain .....	.10	...
McKinley Darragh .....	.56	.54
Nipissing .....	7.70	7.60
Ophir .....	.09¼	.08¾
Peterson Lake .....	.11½	.10½
Right of Way .....	.05½	.04¾
Seneca Superior .....	.02¼	.01½
Silver Leaf .....	.02	.01¼
Timiskaming .....	.33	.32¼

Trethewey .....	.15½	...
Wettlaufer .....	.08	.05
White Reserve .....	...	.13
York, Ontario .....	...	.01½

## Gold.

	Asked.	Bid.
Apex .....	.06¾	.06½
Davidson G. ....	.41	...
Dome Extension .....	.16½	.16
Dome Lake .....	.19½	...
Dome Mines .....	...	10.25
Eldorado .....	.02	.01
Gold Reef .....	.03¼	.02¼
Homestake .....	.55	.45
Hollinger Consolidated .....	4.55	4.50
Keora .....	.25	.23½
Kirkland Lake .....	...	.40
McIntyre .....	1.56	1.54
Moneta .....	.09	.07½
Newray .....	.64	.62
Porcupine Crown .....	.48	.47½
Porcupine Gold, xr. ....	.01½	...
Porcupine Imperial .....	.03¼	.02½
Porcupine Tisdale .....	.02	.01½
Porcupine B. ....	.09	...
Vipond .....	.33	.31
Preston East Dome .....	.05	.04½
Schumacher .....	.45	.42
Teck Hughes .....	.50	.47
Thompson Krist .....	.09	.08
West Dome .....	.20½	.19¾

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Item 1—High-speed Steam Engine, 11" x 10", Goldie, McCulloch, 340 R.P.M.: will take \$200.00.

Item 2—D.C. Generator, 600 Amp., 270 R.P.M. 115-125 volts, belt driven, General Electric: new price \$2,700.00; will take \$750.00.

Item 3—Corliss Steam Engine for above, 13" x 30"; will take \$725.00.

## THE FOLLOWING WOULD REQUIRE SOME OVERHAULING

Item 4—Corliss Steam Engine, in fair condition, 12" x 24", with fly-wheel and 80" driving pulley: will take \$450.00.

Item 5—10 H.P. Vert. Steam Engine, with cylinder head broken; could be repaired; will take \$30.00.

Purchasers would have to be at expense of removing any of the above, except Item 5, from their present positions.

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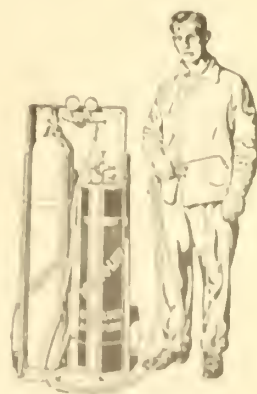
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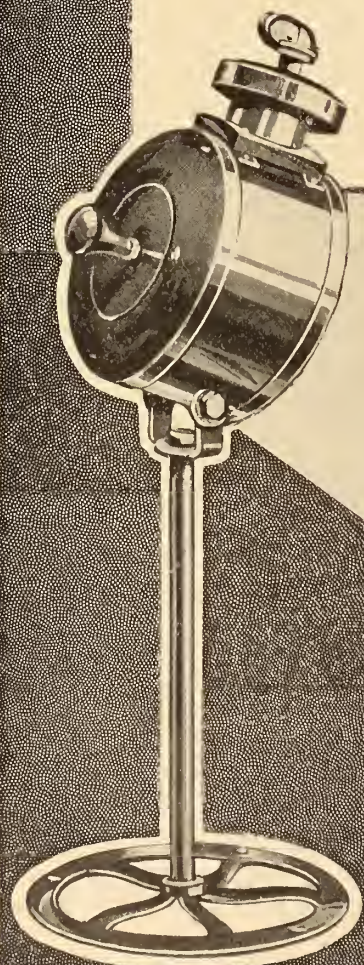
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who is the registered owner of the following Canadian patents: Nos. 76,621; 87,700; 94,332; 94,516; 94,718; 96,182; 96,183; 99,743; 127,397; 129,819; 129,820; 134,271; 135,089; 137,404; 142,607; 147,431; 147,432; 148,275; 151,479; 151,480; 151,619; 151,810; 157,488; 157,603; 157,604; 160,692; 160,693; 160,694; 160,846; 160,847; 160,848; 160,849; 160,850; 160,937; 163,587; 163,608; 163,707; 163,936; 165,390; 166,415; 167,474; 167,475; 167,476; 167,603.

On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

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Notice is hereby given that we will enforce our patents and stop all infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

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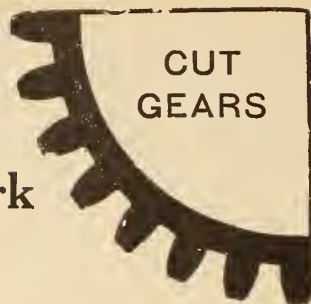
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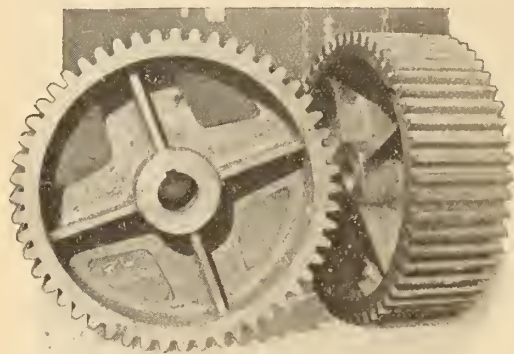
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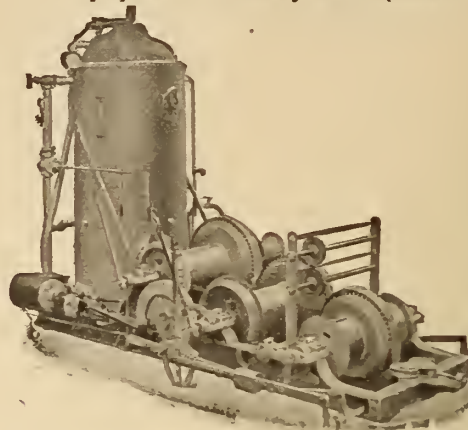
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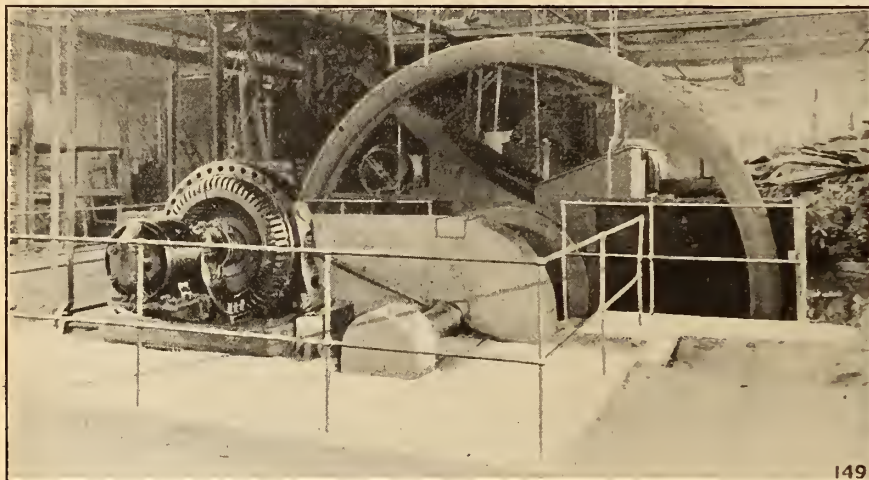
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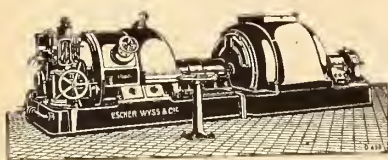
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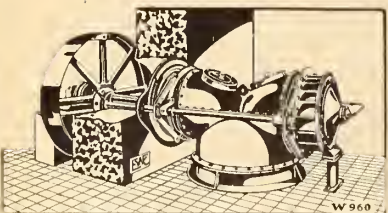
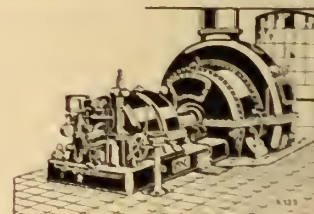
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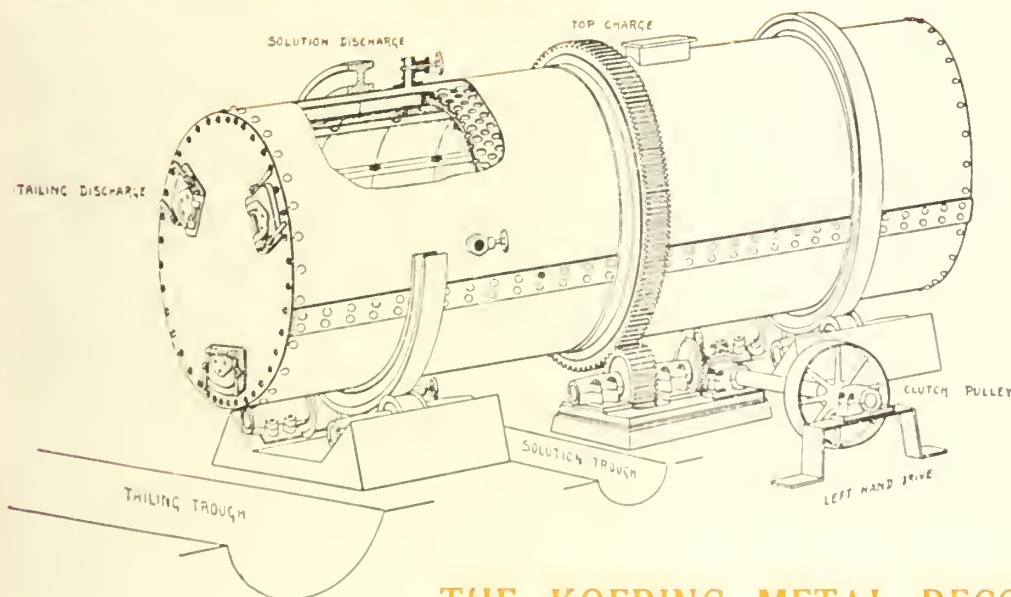
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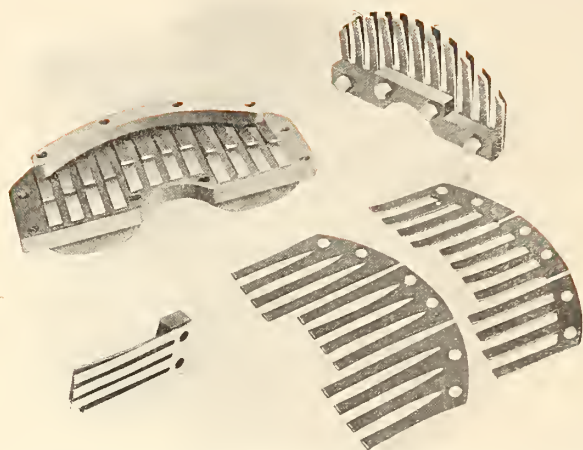
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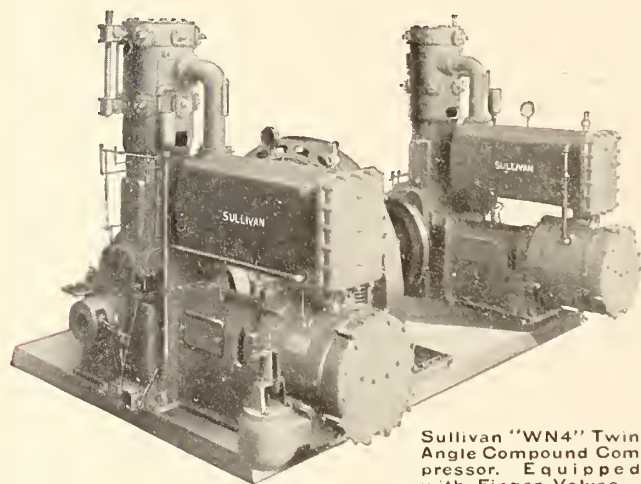


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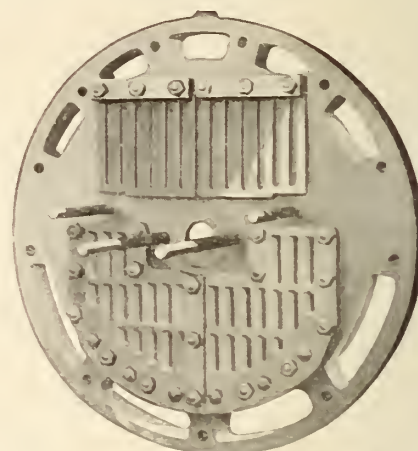
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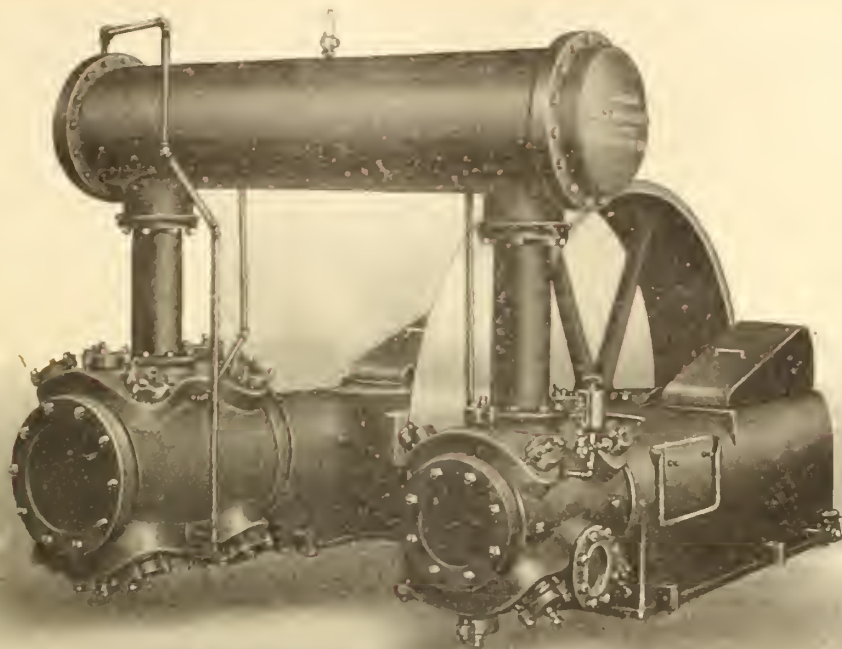
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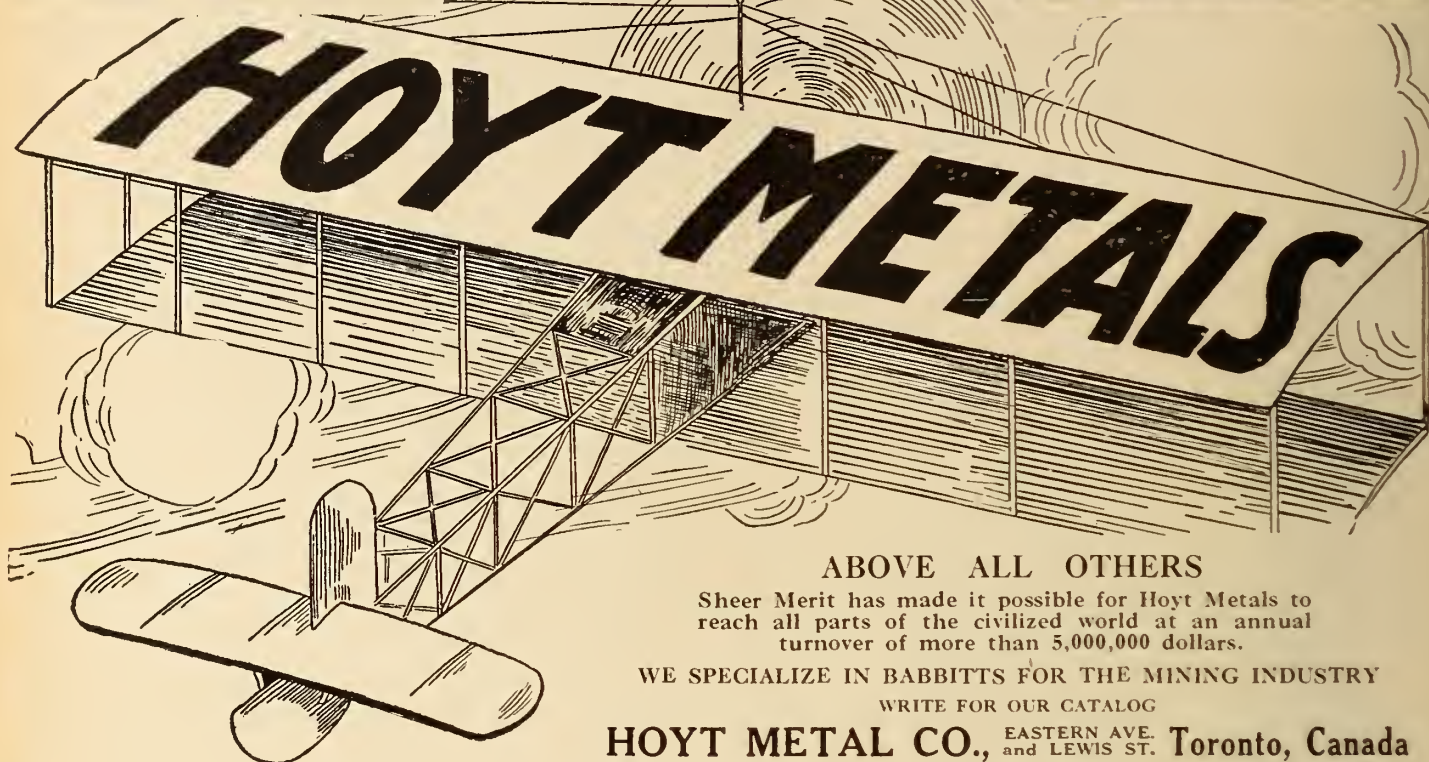
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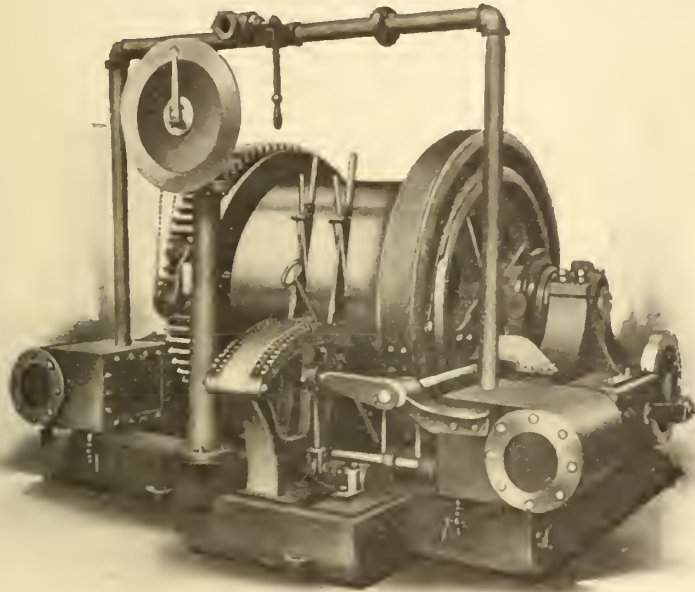
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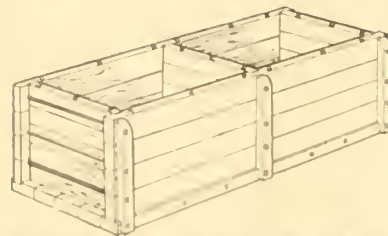
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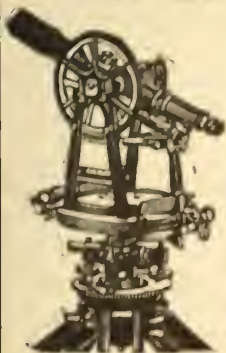
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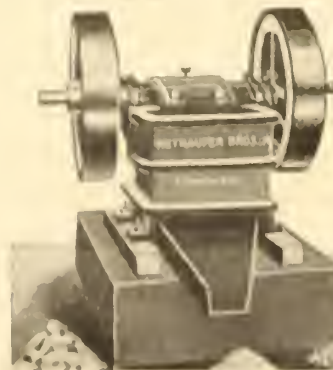


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# THE CANADIAN MINING JOURNAL

VOL. XXXVIII.

TORONTO, August 15th, 1917.

No. 16

## The Canadian Mining Journal

With which is incorporated the

"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada.

Published fortnightly by the

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Editor

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### CIRCULATION

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### ESTIMATION OF ORE RESERVES.

Some of the troubles that arise from failure to include accurate estimates of ore reserves in annual reports of mining companies have been referred to in recent issues of this journal. Those who are interested in the subject will find some interesting discussion in a bulletin just issued by the Canadian Mining Institute.

In the July Bulletin Mr. R. W. Brigstocke suggested that statements in annual reports of mining companies in respect of ore reserves should be verified independently. Commenting on this suggestion several engineers consider it impractical.

Mr. John E. Hardman says: "No estimate of valuation of the reserves 'by an independent engineer' can be made without high costs, for such estimate would have to rest upon accurate and detailed sampling and measurement, both of which take time and cost money. No 'independent engineer' can hope during one visit to become as familiar with the distribution of values as is the regular consulting engineer of the company, whose copies of assay sheets and progress maps bring him weekly into temporary intimacy with the mine."

Mr. R. B. Watson says: "However, with the present custom, the stockholder only has to be suspicious of the manager's statement of ore reserves. How much better off would he be, if he had two—probably divergent—reports to worry over? The manager knows his mine better than an outsider and should be able to make a closer estimate of ore reserves than an auditor of equal calibre. The company directors would have to appoint the auditor and if they picked a poor manager, would they be any more likely to appoint a good auditor? All auditors are suspicious by nature and profession, and any ore reserve that received the official seal would have to be blocked out on six sides or bagged in the ore house. Every annual report would become a battle ground. The conflicting claims of the two engineers would so confuse and disgust the general public that they would have even less confidence than at present in the noble but misunderstood calling of the mining engineer."

Mr. E. P. Mathewson says: "Jealousy on the part of the local engineer would militate against co-operation, or in case this were avoided there would always be the suspicion of collusion. I think Mr. Brigstocke's proposition is hopeless until the millennium dawns."

An alternative suggestion is offered by Mr. Fraser D. Reid. Mr. Reid says: "The writer is of the opinion that if an act were passed, whereby mining companies publishing statements of 'Ore Reserves' were compelled to file, with the Government, an affidavit as to reserves, along with assay plans, slope maps and all information showing how reserves were arrived at,



it would be as effective, less costly, and much simpler than the scheme proposed by Mr. Brigstocke."

There can be no doubt that it will be found difficult to act on Mr. Brigstocke's suggestion. It would be well, however, to consider whether some of the objects striven for could not be obtained. Directors and mine managers should not be content to issue reports which do not give the shareholders the information they want. What do you think of Mr. Reid's proposal?

### THE VALUE OF ASSETS.

The reports of some mining companies indicate that auditors of balance sheets are more eager to detect minor errors than major ones. With painstaking care they add up the fractional dollars and search through the books for little discrepancies. Then they calmly ignore errors of a few hundred thousand dollars in estimated value of assets.

It is obvious that the auditors have often not the necessary information to permit them to pass upon estimates of the chief assets of a mine. Why, then, do they append their signatures without stating frankly that their audit is only a partial one. Would it not be better to indicate clearly what figures have been checked carefully, and what are mere approximations or entirely arbitrary?

It may be convenient for book-keeping purposes to use some arbitrary or approximate figures in annual reports. Is it fair to the shareholder to fail to indicate the character of these figures?

The price of silver continues to rise. According to reports the demand from India is likely to continue large and increase in silver coinage in other countries is to be expected. The outlook for the companies producing silver is very bright. The embargo on shipments to India gave a temporary check to the rise in price; but the upward trend has been resumed.

### TO ACQUIRE ORE DEPOSITS AND CONSTRUCT COKE PLANT.

The directors of the Steel Company of Canada, at a meeting in Montreal recently, practically adopted a new policy which is likely to have an important bearing on the future of the company. In co-operation with American interests, the directors propose to acquire certain ore and coal properties situated in an advantageous location in the Eastern States, from which such of its supply as is necessary in the future will be drawn. Hitherto the company has not controlled its supply of raw material, although it has enjoyed the reputation in the steel trade of having the benefit of some exceptional contracts.

It was stated that the plans of the company included the construction of a considerable plant for the production of coke.

The Steel Company of Canada has been the only large domestic steel corporation without its own ore and coal reserves.

### CORRESPONDENCE.

#### The Survey of Mining Claims in Ontario.

To the Editor of the Canadian Mining Journal:

Sir,—It is a well known fact that when any special rights or privileges are granted to any class of people, this same class of people will in the course of time abuse the privilege, granted, unless easy and inexpensive means within reach of anyone interested, that will act as a restraining influence, are provided.

When the Ontario Legislature passed the Act making it compulsory to have the survey of a mining claim performed by an Ontario Land Surveyor, in order to be acceptable to the Government, the object undoubtedly was to make sure that such a survey would be performed by a man qualified to make a correct survey. When mining progressed and new camps were discovered, the O. L. S. found his services very much in demand. This resulted in a contract system being in a majority of cases adopted, whereby the surveys are performed by the O. L. S. at an agreed price per claim. Then in order to survey the greatest number of claims at the least expense to himself, the O. L. S. hires bushmen who are familiar with the country, to go and cut out, picket out, and chain the lines of the claims to be surveyed. This being done by men who have not the technical knowledge of surveying and without a transit, the result is far from accurate, and in cases where the line comes out within a few feet of the post and the posts are moveable, the posts are shifted so as to conform to the line, in place of the line being rerun. Of course they know that they are taking ground from Peter and giving it to Paul, but speed, not accuracy, is the first consideration.

In the course of time the O. L. S. arrives and by setting up his transit at the corners of the claims, he gets the angle and compass bearings from the pickets in sight. He gets the chainage notes from his men and the job is completed. In this manner he is able to complete several claims in one day and at a cost of only a fraction of what the claim owner has to pay. As he finds the posts at the corners and as the lines lead him from corner to corner the survey must be accurate. Of course he has no means of knowing if any of the posts have been moved. Very often he forgets to bring the iron posts required by the Mining Act to be planted at the corners, and usually offers the job of placing these posts to some one in the camp, who promises to plant them. Promises, like piecrust, are easily broken, and as a result subsection 4, section 113. The Mining Act of Ontario is seldom complied with.

I do not mean to say that all the O. L. S. are performing their work in this manner; but I know of some who do. While it may be satisfactory to the Department, it is not accurate nor satisfactory to some of the claim-owners.

In B. C. the law requires the Provincial Land Surveyor, in surveying a mining claim, to run all lines with a transit, using hubs driven in the ground. These hubs are provided with a copper tack which indicates the centre of the line. All measurements are taken from the hubs. As all these hubs are noted and the field notes filed in the Recording Office, as well as at the Department, it becomes a simple matter to check the accuracy of a survey. An interested party, who may be affected, can have a P. L. S. go over the work. If error is found a third P. L. S. is called in to act as umpire. If the first survey is found to be incorrect the P. L. S. who performed such incorrect survey is required to pay all costs. As a result the P. L. S. is extremely



careful to do his work correctly. His plans filed at the proper offices are required to show where the claim posts are located, as well as north and south. That however, does not seem to be required in Ontario, judging from a copy of a plan, just received from the Department, that lacks this very essential detail.

Yours, etc.,

L. O. Hedlund.

West Shiningtree, Ont., July 22, 1917.

### The Phosphate Discussion.

To the Editor of the Canadian Mining Journal:

Sir,—After the amusing and somewhat pyrotechnic correspondence which has recently taken place in the Mining Journal with reference to the discovery of phosphate of lime in the Canadian Rockies, it is perhaps advisable that an independent statement should be made in order that your readers, who are not conversant with the animosities underlying the correspondence, may be put in possession of the facts of the case.

The need for phosphate of lime, which will arise as years go on and more intensive methods are employed in connection with agriculture in the Northwest, naturally leads any one interested in conservation in the Dominion, to think of the sources of raw material for the manufacture of phosphatic fertilizer in that part of Canada.

Now it happens that some of the greatest deposits of this mineral which are known in the world lie in Idaho, Utah and Montana. They occur at a certain definite geological horizon and are found in beds. It, therefore, seemed to be a matter of interest and importance to ascertain whether it was possible to locate this same geological horizon several hundred miles further north in the Dominion of Canada, and if so, to ascertain whether in this northern extension, phosphate beds occurred at the same horizon.

In the summer of 1915, having a month in which I could absent myself from University work in the east, I placed my services at the disposal of the Commission of Conservation and with Mr. Diek of the Commission went to the West to see whether we could succeed in discovering such a deposit.

The successive steps by which, applying the principles of geological field work, the looked for horizon was found near Banff, need not here be detailed, since they have been described in our report issued by the Commission of Conservation, (*Discovery of Phosphate of Lime in the Rocky Mountains*, by Frank D. Adams and W. J. Diek, Ottawa, Dec. 1st, 1915), and also in a paper read before the Canadian Mining Institute three months later in March, 1916, and published in the Transactions of the Society.

In carrying out the investigation the excellent maps issued by the Geological Survey of Canada were invaluable, and fortunately the Survey had published an especially detailed map of the district about Banff surveyed by Professor Allan. After a careful study of this map it was decided to look for phosphate beds along Forty Mile Creek, since this stream, three times in its course, cuts through the beds in which the phosphate might be expected to occur.

The detritus in the valley of this stream was found to contain much chert, like that associated with the American deposits, and this chert was found to contain phosphoric acid. On carefully examining the section on Stony Squaw Mountain, phosphate rock was found in place at one point, the exact locality being indicated

on the photograph shown on plate VII. of the report in question, and also reproduced in the paper published in the Transactions of the Canadian Mining Institute. This phosphate rock, however, was very low in grade, and the search was, therefore, continued in the stream for float derived from other and richer deposits. This search was rewarded by finding a large mass of float which weighed over 30 pounds, in the stream at the foot of Stony Squaw Mountain. This material had all the characters of one variety of the Montana phosphate and was found to contain 53.95 per cent. of phosphate of lime, indicating a material of fair grade.

This afforded direct proof that higher up the stream a heavier and richer deposit of mineral occurred in the form of one or more beds which had been cut through by the stream. It was, however, impossible for us to prosecute the search further, since the time at my disposal was now exhausted.

Upon returning to Ottawa an announcement was published to the effect that a deposit of phosphate of lime occurred in the Canadian Rockies near Banff, which, there was reason to believe, from the size and character of the float, would be of economic value. This was the first announcement ever made of the occurrence of phosphate of lime in the Canadian Rockies.

The result of the investigation, together with the specimens collected, were then laid before Dr. R. J. McConnell, the Deputy Minister of Mines, and Mr. Hugh S. de Schmid of the Mines Branch was at once sent to Banff to continue the work. This was prosecuted by him until the snow fell. Mr. de Schmid located the second bed, from which the float was derived, a few hundred yards up the creek from the point at which the float was discovered. The bed, however, was only about one foot in thickness. He then traced the bed along its strike for over thirteen miles and on the flank of Mount Norquay found that it had increased in thickness to two feet. On his return to Ottawa, Mr. de Schmid presented the results of his investigation, which were embodied in an excellent report (Hugh S. de Schmid—"Investigation of a Reported Discovery of Phosphate in Alberta, Bulletin No. 11, Mines Branch, Department of Mines, Ottawa, 1916.") The following extracts from this report will summarize some of Mr. de Schmid's conclusions:

"These phosphate deposits can scarcely be regarded as of particularly economic importance, since there is only one phosphate horizon of any consequence. This bed possesses an average thickness of about twelve inches. On the other hand, in the event of any attempt to exploit these deposits, there are at least two localities in the Banff district where phosphate outcrops are situated favorably for working; one of these, the Mount Norquay outcrops, lies three-quarters of a mile from the main road, though the railway runs within about one mile of the southern exposure."

As above remarked, at these latter outcrops the bed is two feet in thickness.

With reference to the amount of phosphate of lime present in the area in question, Mr. de Schmid makes the following statement: "With an average bed thickness of one foot and a depth limit for working of half a mile, this would give ten square miles of bed, or 26,137,600 short tons of phosphate rock for the area."

It may be safely stated that there is no other area in Canada at present known and of the same size which can be asserted to contain an equal amount of phosphate of lime.



Mr. de Schmid goes on to say that "While unsuited to the manufacture of super-phosphate by the sulphuric acid method, the Alberta rock would probably prove suitable for treatment by one of the thermic processes which have lately been proposed to supplant the sulphuric method."

The fact that Mr. de Schmid had located this richer bed was first announced in a paper on the discovery of these deposits which I read before the Geological Society of America, at Washington in December, 1915, and was published in an abstract of this paper, which, at the request of the officers of the National Academy of Science, appeared in the proceedings of the Academy a few weeks later.

To sum up then: The phosphate deposits of the Western United States have been found to extend across the boundary line into Canada. In a small area near Banff over 26,000,000 short tons of phosphate of lime are present. The bed varies in thickness considerably; but is too thin to work at the present time under present conditions. In that part of the area, however, where the bed is two feet thick and well situated for working, with changing conditions, as time goes on, especially should a law forbidding the export of phosphate from the United States be enacted, as has already been recommended by certain influential interests in that country, Canadians may be very glad to avail themselves of this great deposit of phosphates. Furthermore, the horizon containing these deposits has been found to strike both north and south from the Banff area, and hundreds of miles of promising tracts in Canadian territory await detailed study and prospecting for additional and richer bodies of this valuable mineral. The discovery as a matter of fact is one of much interest and importance, adding, as it does, another item to the mineral wealth of the Dominion of Canada.

In Professor Haultain's letter in your issue of July 1st, entitled the Ferrier-Adams Episode, he humorously reverts to his "idee fixe" with reference to the Geologist and the Mining Engineer. My old friend, Dr. Ferrier, is cited as a type of that ideal and commanding personality—the Engineer—who "followed up his discovery—as an Engineer—with care and thoroughness and then held his tongue—as an Engineer—until his clients gave him their long withheld permission to speak"—while the Geologist, with fewer facts at his disposal, got the credit for the discovery. Professor Haultain's story would have been a good one if his facts were correct. It is not a matter that I would have touched upon had he not compelled me to do so—but to continue the comedy, I may set forth the actual facts. The Engineer in the case, having been engaged by private clients to carry out certain work for them and to "hold his tongue" with reference to it, did so absolutely for some four years. But no sooner had these deposits been discovered by the Geologists than this silence was at once broken. The Deputy Minister of Mines, and a number of other gentlemen connected with the mining industry, were informed by Dr. Ferrier, who seemed to consider himself in some way aggrieved by our discovery, that he knew of the existence of these deposits and that they were "no good." This information naturally spread abroad in all directions, and, employing Professor Haultain's expressive phrase, "like the story of the crows, grew in the telling." When our report was nearly ready for the press, Dr. Ferrier also suggested that he should join us and

that a joint report be issued. This we declined, preferring to take the responsibility for our own work only, while at the same time pointing out to Dr. Ferrier that all the usual channels of publication open to us were open to him and that if he had any facts to make known to the public, he should at once do so over his own signature. He, however, did not see fit to do this. All this took place, it will be noted, several months before Dr. Ferrier received permission to say anything, since at the meeting of the Canadian Mining Institute in Ottawa, on March 1st, 1916, he stated that he had only succeeded in obtaining this permission on the previous day.

"Discovery" is only discovery when it is recorded. In his previous knowledge of the existence of these deposits Dr. Ferrier resembled the Creator of the Universe whose knowledge even antedated that of Dr. Ferrier, but the knowledge in both cases was equally valueless to the community, for neither revealed the secret. It is, furthermore, rather difficult to understand why Dr. Ferrier seemed so anxious to grasp at some shred of credit for a discovery which he asserted was of no value.

And so this heroic and ideal figure of the Mining Engineer, clothed with knowledge and girded about with silence, like some other glorious conceptions, upon examination "fades into the light of common day," while the more prosaic geologist, working in the interest of the public, and stating plainly what he had found so soon as he had found it, obtained the recognition due to his work. Yours, etc.

Frank D. Adams.

July 17, 1917.

#### Concerning the Proposed Information Bureau.

To the Editor of The Canadian Mining Journal:

Sir,—In your editorial "Development of Resources," in your issue of July 15th, you struck a true note when you wrote: "The success of the Bureau insofar as Canada is concerned will not depend so much on the initiative of those in London as on the ability of Canadians to keep the Bureau informed on Canada." You might have said with advantage, "willingness and ability." Still, without continual reminders a bureau from three to six thousand miles away is apt to be forgotten and, consequently, co-operation cease.

During the last two years it has fallen to my lot to see that the mineral section of Canadian exhibit at the Panama-Pacific, and Panama-California, International Expositions was kept as much as possible up-to-date from both a mineral and metallurgical standpoint. To do this while away from the country, one has had to rely on the technical press of both Canada and the United States and on the daily press of the mining sections of Canada. When a new mineral discovery or a new metallurgical process was reported in the press, if the parties making the discovery were known to be trustworthy they were written to and asked for such information as they were prepared to divulge and for samples that might prove of interest for the exhibit.

If, on the other hand, the discoverers were unknown, the Bureau of Mines of the province in which the discovery was made, or the Federal Department of Mines, was asked to corroborate the report and if possible to obtain samples. In this way, of course, it should have been possible to keep our department absolutely up-to-date with regard to both mineral discoveries and metal-



lurgical developments. I am pleased to be able to say that in the vast majority of cases we received the hearty co-operation of miners and metallurgists and always that of the heads of the departments, both provincial and federal, to whom I applied; but in a few cases, and generally from quarters least expected, my applications were turned down.

Though horribly annoying at the time, this produced many amusing situations. One of the first things a visitor is prone to seek at an international fair is something from his own part of the country; it matters not whether it be a turnip, a piece of ore or a shell. He is a very sore person and disposed to relieve his mind in no measured language if he finds his section has been neglected. I encountered several such persons during the two fairs; but fortunately, to my relief and their chagrin, I was generally able to take them to my office and show them letters, that had been denied or ignored, requesting for the exhibit the very things that they found wanting. On two such occasions there must have been trouble when the visitors returned to Canada, for immediately after their return we received by express excellent representative exhibits from mine managers who had previously denied our applications. The visitors happened to be large shareholders in the mines.

So, then, as you point out, co-operation and co-ordination of Canadian owners and operators with their representative in the Bureau at London is essential to the success of the enterprise; but not a little factor in that success will depend on the representatives in London, who will have to be ever watchful of Canadian developments reported in the press and often will have to exercise fine judgment and make diligent inquiry to winnow the wheat from the chaff. Yours, etc.,

F. H. Mason.

San Diego, Calif., July 30th, 1917.

## MINERAL SURVEY AND DEVELOPMENT ACT OF BRITISH COLUMBIA.

The "Mineral Survey and Development Act," finally passed by the Legislative Assembly of British Columbia on May 3rd last, is "An act to make provision for a mineral survey of the Province of British Columbia and for the development of the mineral resources of the said Province, including provisions in aid of prospectors and miners and for the protection of wage-earners and investors."

Part I. of this act provides for a "Mineral Survey of the Province," for all purposes relating to which the Province is divided into six "Mineral Survey Districts," and for the appointment of a resident engineer for each district, each such appointee to be a duly qualified mining engineer who shall be a graduate of a recognized mining school or college, or member of some recognized society of engineers."

since the act was passed) are as follows:

The several districts and the Engineers appointed:

(1) The Northwestern District, comprising Atlin, Stikine, Liard, Skeena, Portland Canal, Bella Coola, and Queen Charlotte mining divisions. Permanent survey station and office at Prince Rupert. Resident engineer, Mr. G. A. Clothier.

(2) The Northeastern District, comprising Omineca, Peace River, Cariboo, and Quesnel mining divisions. Office at Hazelton. Resident engineer, Mr. J. D. Galloway.

(3) The Central District, comprising Clinton, Lillooet, Kamloops, Ashcroft, Nicola, Vernon, and Yale

mining divisions. Office at Kamloops. Resident engineer, Mr. R. W. Thomson.

(4) The Southern District, comprising Similkameen, Greenwood, Grand Forks, and Osoyoos mining divisions. Office at Grand Forks. Resident engineer, Mr. P. B. Freeland.

(5) The Eastern District, comprising Golden, Windermere, Fort Steele, Ainsworth, Sloean, Sloean City, Trout Lake, Nelson, Arrow Lake, Revelstoke, Lardeau, and Trail Creek mining divisions. Office at Revelstoke. Resident engineer, Mr. A. G. Langley.

(6) The Western District, comprising Nanaimo, Alberni, Clayoquot, Quatsino, Victoria, Vancouver, and New Westminster mining divisions. Office at Nanaimo. Resident engineer, Mr. W. M. Brewer.

The prescribed duties of each engineer are as under:

He shall (a) Undertake and carry on continuously a mineral survey of the district for which he is appointed:

(b) Keep complete and comprehensive records and plans of such survey as the same progresses, in prescribed form.

(c) Keep complete official records of his office and official business, as prescribed.

(d) Make all such reports to the Minister of Mines as from time to time prescribed.

(e) and (f) Perform the duties imposed upon a resident engineer, as provided for by the act.

In addition, under Part II. of the act:

"Each resident engineer shall, so far as practicable, in and throughout his Mineral Survey District assist miners and prospectors in the manner following:

"(a) By giving information as to mineral indications and as to ground open for location as mineral claims or placer mines as a result of knowledge gained during the carrying-out of the mineral survey of his district;

"(b) By examining samples and applying such tests as may be possible on the ground or in his office and advising as to the nature of any mineral and as to the best available methods of analysis, sampling, assay, and test;

"(c) By forwarding samples to the Minister of Mines for further examination and tests whenever in his opinion such course is necessary or expedient;

"(d) By reporting to the Minister of Mines the location and approximate cost of such roads, trails, and bridges as in his opinion are reasonably necessary in order to render possible the development of any mineral resources; and

"(3) Generally, by giving such advice, information, and directions as may be of assistance to miners and prospectors within his district."

The foregoing are the chief provisions relating to resident engineers and their duties; other parts of the act make provisions for other objects in view in enacting this legislation.

## ACTIVITY AT EAST BROUGHTON.

The old Ling asbestos mine at East Broughton is being reopened. The mill has been remodelled and shipments commenced.

## ALBERTA COAL MINES

Operations have been resumed at all coal mines in Alberta except the Jasper Park Collieries.



## THE EXPLOSION IN No. 12 COLLIERY OF THE DOMINION COAL COMPANY.

By F. W. Gray.

An explosion occurred in No. 12 colliery of the Dominion Coal Company at New Waterford about 7.30 a.m. on the 25th of July, which resulted in the death of 62 of the men in the mine, and the death of three members of the rescue parties. One man was rescued alive 36 hours after the explosion took place.

No. 12 colliery is on the Victoria seam, and the territory tributary to the workings is largely submarine. The deeps are down from the mouth of the slope approximately 3,500 feet, about 1,500 feet past the shore line. The method of extraction is pillar and room. The seam is from six to seven feet in height, and has sufficient inclination to allow the coal from the working rooms to be dropped down to the haulage levels by self-acting inclines, or "balances."

The mine is damp and free from dust, and could not be considered as a gassy mine.

On the west side of the mine the levels are longer than on the east side. The full extent of the levels on the west side is over 4,000 feet. Mechanical haulage is used along the main levels. The explosion area was confined entirely to the west side, and affected only No. 6 and No. 7 levels and the workings in between. Men were killed by gas in No. 4 level; but the evidences of violence and destruction were confined to Nos. 6 and 7 levels, and in those levels the area of violence was very restricted and ended quite abruptly.

The victims of the explosion died from monoxide poisoning, from burns, and from violence, according to the place where death took place; but in every case death must have taken place instantly, or within a very short period of time. The ventilation of the main haulage deep and the running of the haulage trips was not affected by the explosion, and in the lower levels, Nos. 8 and 9, the men were not aware that an explosion had taken place until they received warning. The outstanding features of the explosion are its violence in a restricted area, and the quickness with which the normal ventilation of the mine was restored. The mine was clear of noxious vapors by the evening of the day of the explosion, and all the bodies were recovered at the close of the second day. The work of rescue was very quickly undertaken. Unfortunately three of the rescuers were overpowered by monoxide gas, and although they received every possible medical attention, two of these brave men died after reaching the surface.

An inquest on the victims is proceeding at the time of writing, and an investigation is also proceeding under the chairmanship of the Inspector of Mines. The investigating committee consists of the Inspector of Mines and one of the Provincial Deputy Inspectors, Mr. T. J. Brown, the general superintendent of the Nova Scotia Steel & Coal Co., and Mr. G. B. Burchell, manager of the Bras d'Or Coal Co., Mr. A. J. Tonge, the general superintendent of the Dominion Coal Company, and Mr. Alex. MacDonald, superintendent of No. 3 district of the Dominion Coal Company, and five representatives of the Amalgamated Mine Workers of Nova Scotia.

When the investigating committee makes its report it is expected this will be made public and that it will throw light on the origin of the explosion. The characteristics of the explosion are clearly defined, and it is hoped the work of the committee will make it possible to assign a definite cause for the explosion, and possibly to enable precautions against a repetition. Until

the report is issued it would be premature to comment further, except that every praise is due to the officials and workmen of the company for the prompt and efficient work of restoring the normal conditions of the mine ventilation, and for the recovery of the injured and killed so rapidly. The work of rescue and recovery was carried on under conditions of great danger from falling roof and timbers, and, in the first stages, from the afterdamp of the explosion, but the best traditions of miners were fully maintained.

The victims of the explosion numbered 30 native Nova Scotians, 22 men from Newfoundland, and a number of Russians, Austrians and Germans.

The company has as yet made no statement, except to express its thanks for the help of its workmen and officials and that received from outside. The company says "Help was given in the most sympathetic and spontaneous fashion not only by the employees of the company and their families, but by the general public, and by the doctors, clergymen and nurses, who came from every direction in a very short time.

"When all gave help to the best of their ability it would be invidious to attempt to name those who so willingly volunteered their services. The company will endeavor, so far as that may be found possible, to convey its thanks by personal communication, but it will not be possible to avoid missing in this manner some of those who came forward to assist, and the company has asked the wider publicity of the newspapers in its grateful acknowledgment of the practical help given by its own employees and the general public.

"The management of the company further wishes to record its thankful observation of the widespread community of sympathy evoked by the lamentable disaster at New Waterford, as shown by the letters and telegrams and offers of assistance that have arrived constantly since the morning of the explosion."

The No. 12 explosion has the melancholy distinction of ranking second in the list of Nova Scotian mine explosions, so far as regards the loss of life. The Springhill explosion in 1891 caused the death of 125 men, and that of the Drummond Colliery in 1873 numbered 55 victims. The Dominion Coal Company has had but one disaster of this kind previously, namely, the slight explosion at Caledonia Colliery in 1894, following a mine fire, when 11 men were killed by monoxide poisoning.

The dependents of the men who lost their lives will be adequately provided for by the payments prescribed by the Nova Scotia Workmen's Compensation Act. The number of married men in the list was proportionately unusually small. The assessment made by the Compensation Board on the coal mining section for the first year of the operation of the Act was 3½ per cent. of the payroll, which in itself will provide on the payroll of the Dominion Coal Company alone more than sufficient to meet the capitalized liability that will result from the dependency claims arising out of the explosion.

The application of the workmen of the Dominion Coal Company for permission to contract out of the provisions of the Act has given rise to a great deal of misapprehension, and it has been suggested that it is fortunate a contracting-out certificate should not have been granted before this explosion occurred. This impression needs to be corrected. The granting of a certificate to contract-out would in this case merely have meant that the payments prescribed by the Act would have been disbursed through the medium of the



local Benefit Society instead of through the Compensation Board at Halifax. Nothing can lessen in any way the benefits provided by the Act, and the only question involved in the application of the workmen of the company for permission to contract out was whether the administration of the provisions of the Act should be directed from Glace Bay or Halifax. It is most unjust to suggest that the granting of a contracting-out certificate would have injured the claims of the dependents of men who have lost their lives in this disaster.

Any financial assistance required by the families of the deceased workmen, pending the adjustment of the compensation payments, will be given by the company, which has already seen to this.

### NOVA SCOTIA STEEL.

Boston, Aug. 6.—On the recent offer of 50,000 shares of Nova Scotia Steel it is understood that shareholders took only about 10 per cent. This means that 45,000 shares of this company's ordinary stock have come into possession of a group of underwriters almost wholly living in the United States. Many of these underwriters have been actively interested in the steel industry and are among its foremost leaders.

With the former holdings of Hayden, Stone & Co.'s clientele this means the transfer of a decided majority of the stock ownership of this great property to the United States. There is in this transfer of ownership nothing whatever in any possible way inimical to British or Canadian interests and we believe that fact is thoroughly understood in British and Canadian governmental circles.

This transfer, however, fits in perfectly with the plan of Hayden, Stone & Co., and many of their substantial clients to exercise the dominant interest in the development and expansion of this steel property.

For more than a year there has been a search in progress to get the right man to take charge of this development. It is believed that this man has been found in Frank H. Crockard, who has within a few weeks been chosen president and general manager of the Nova Scotia Steel Co. Up to a few weeks ago Mr. Crockard was vice-president and in charge of operations and construction of the Tennessee Coal and Iron plants of the United States Steel Corporation at Birmingham, Alabama.

Mr. Crockard comes to the Nova Scotia Steel & Coal Co. with about as enviable a reputation for success and character as any man in the entire industry.

It is believed that only a very short time will elapse before information will become public of a more or less definite character as to the scope of plans of the new ownership for the development of this property. At present the owners of this property are well represented on the board of directors by N. Bruce MacKelvie of Hayden, Stone & Co.

Another large coal development company has been organized by Calgary business men for the purpose of mining that product in the bituminous fields west of Edmonton, Alberta. The company is capitalized at \$750,000 and will have headquarters in Calgary. The incorporators, as announced in a despatch from Ottawa, are three young men of the legal firm of Longheed, Bennett & McLaws. They are: C. W. Coole, O. H. Might and F. G. Beaumont.

It is understood that others of the Longheed & Bennett firm are financially interested in the corporation.

### KIRKLAND LAKE GOLD MINING COMPANY, LTD.

In a report to the shareholders of Kirkland Lake Gold Mining Company, Limited, President F. L. Culver says:

Six years ago, gold was first discovered in the Kirkland Lake district. This district is situated seventy miles north of Cobalt about four miles from the Temiskaming and Northern Ontario Railway, which is owned and operated by the Ontario Government. Recently an appropriation was made by the Government to extend a branch line into the camp.

As soon as the discovery of gold became known the usual rush of prospectors into the district took place. Claims were staked, companies organized to take over the claims, and development work started. However, only one company, the Tough-Oakes, carried on work consistently until they were enabled to make their ground become a producer. Other companies worked intermittently as funds were available, and the next property to become a producer in the camp was the Teek-Hughes. Both of these companies now have well established plants and mills, while the Tough-Oakes has entered the dividend-paying class. This district is now very active, with a great many properties in the development stage. We understand that the Lake Shore has let the contract for the erection of a mill.

A syndicate staked a number of claims consisting of 362 acres and afterwards organized a company known as the Kirkland Lake Gold Mines Limited, deeding their claims to the company for which they received stock in the company. All assessment work required by the Government was done by them and patents obtained. A small prospecting plant, consisting of two small boilers, a three-drill compressor and a small hoist, was erected on one of the claims known as the McKane lot, and a shaft sunk to a depth of 68 feet. Finances then became at a low ebb, and it was found necessary to reorganize the company and increase the capitalization from one million to two million shares. The new company was known as the Kirkland Lake Gold Mining Company, Limited, capitalized at 2,000,000 shares (par value \$1.00 each) with 966,666 shares in the treasury, the remaining shares belonging to the original syndicate.

In October, 1915, negotiations were entered into by Kirkland Lake Gold Mining Company Limited and Beaver Consolidated Mines Limited, which latter company took an option on all of the shares of Kirkland Lake Gold Mining Company Limited, owned by the syndicate and some of its treasury shares. The property, plant, etc., were turned over to the Beaver management, who immediately dewatered the shaft for an examination and found that it had been sunk to a depth of 68 feet on a vein where free gold was plainly discernible. A great deal of preliminary work had necessarily to be done in anticipation of actual mining operations which were commenced by the Beaver company about January 1st, 1916.

The shaft has been continued until it has reached its present depth of 600 feet, stations being cut at the 100, 200, 300, 400, 500 and 600 ft. levels. The following is a description of development which has been accomplished on the different levels.

100 ft. level—The vein in the shaft was followed for a distance of 166 feet with very encouraging results. A large tonnage of ore has been put in sight on this level.



200-ft. level—Crosscutting a short distance to the south of the shaft and drifting from where it was supposed the vein would come in, led to the assumption that the vein had faulted, consequently operations were temporarily suspended on this level and the shaft continued to the 300-ft. level.

300-ft. level—When this level was reached and the station completed, a crosscut was commenced, and 19 feet from the station, a vein about five feet wide was encountered, channel assays from which average \$11.00 to the ton. Continuing the crosscut, ten feet of porphyry was cut, assays from which average \$7.00 to the ton, when another vein, running parallel with the first vein, was encountered. This second vein is 12 feet wide, channel assays from which give an average of \$12.80 to the ton. Visible gold is plainly discernible through the vein at this point.

400-ft. level—The station was cut at this level, and crosscutting to the south as on the levels above, the main vein was encountered, which, at point of intersection, proved to be eleven feet in width. Two drifts were commenced on the foot wall or north wall of the mineralized zone, one to the east and one to the west. No. 2 or east drift has been driven on for a distance of 37 feet and is in high-grade mill ore all the way, but in No. 1 or west drift, the values pinched out after about 60 feet. In order to ascertain the width of the orebody a crosscut was driven south from this point and a vein seven feet wide was encountered, which, where cut, gave values of \$47.00 to the ton. This vein has been drifted on for a distance of 295 feet, of which distance 220 feet is in ore. The result of the work on this level is particularly encouraging and a large tonnage of ore has been blocked out.

500-ft. level—Work on the upper levels proved that the vein was gradually dipping to the south; it was, therefore, necessary to drive a distance of 70 feet from the station on this level before encountering the orebody which at point of intersection is 27 feet wide. On the foot wall of the ore deposit a quartz vein five feet wide has been followed for a distance of 46 feet. The quartz is narrowing down, but the ore is of a better grade than that first encountered. On the hanging wall, drifts have been driven both east and west. No. 1 drift is in 90 feet and is improving with each round. No. 2 drift is exceptionally rich with free gold throughout its length of 30 feet.

600-ft. level—As on the 400 and 500-ft. levels, there are two heavy bodies of quartz, one on the hanging wall and one on the foot wall. Drifting to the extent of 31.5 and 27.5 feet respectively on these orebodies has been done and strong veins are showing in each heading. Besides the two main bodies of quartz, the porphyry is full of quartz stringers and isolated masses of quartz, similar to the condition which obtains on the levels above. The orebody was first cut 44 feet south of the shaft and is 42 feet wide.

Summary—Work on the Kirkland Lake property has been in progress for about one year and six months, during which time the following development work has been accomplished: Drifting, 1,534.5 feet; cross-cutting, 796.0 feet; station cutting, 215.5 feet; sinking, 526.0 feet; total, 3,072.0 feet, which with the 68 feet of sinking previously accomplished, gives a grand total to date of 3,140 feet. It is the intention to continue the shaft to a depth of 700 feet as quickly as possible.

No stoping has been done on the property so far, all ore which has been extracted being taken from development work in driving on the veins. We estimate

to have on the surface ready for milling about 6,000 tons of ten-dollar ore and a careful and conservative estimate of the value of the ore in sight underground is placed at \$420,180.

As the present shaft is near the eastern boundary of the property, development has been towards the western or central part of the property, where it will be necessary to sink a permanent working shaft of sufficient capacity to take care of the large tonnage of ore which is now in sight. Near the new or central shaft, a mill and power plant will be erected. The mill will have an initial daily capacity of 150 tons and will be so constructed that another unit can be added at any time at a minimum cost.

The Northern Ontario Light and Power Company has recently constructed a power line from Cobalt to Kirkland Lake, a distance of about 70 miles, and there is an abundance of electrical power available for the operation of a plant.

There are no debts whatever against the company, and money is being provided for development purposes from month to month by Beaver Consolidated Mines Limited (they taking treasury shares for same).

#### Balance Sheet.

Financial statement for period ending 31st May, 1917:

Assets.	
Cash in bank .....	\$ 8,212
Accounts receivable .....	45
Supplies on hand .....	12,536
Unexpired insurance .....	348
	<hr/>
	\$ 21,142
Mining claims .....	\$1,000,000
Buildings, plant, machinery and equipment .....	34,904
Development .....	129,041
	<hr/>
	\$1,185,087
Liabilities.	
To the public—	
Wages accrued .....	\$2,098
Accounts payable .....	5,637
	<hr/>
	7,736
	<hr/>
	1,177,351
To the shareholders—	
Capital authorized .....	\$2,000,000
Less unissued .....	169,474
	<hr/>
	1,830,526
	<hr/>
Discount on shares issued .....	\$ 653,174

#### ASBESTOS MINES BUSY.

Asbestos mining companies in Quebec are increasing operations to meet the demand. High prices are now offered and properties that have been idle will soon be working again. The regular producers are materially increasing their output.

#### ANTIMONY.

The West Gore antimony mine is increasing output as the result of the opening up of a new oreshoot.

#### MOLYBDENITE.

Prospecting for molybdenite in the vicinity of Quyon, Quebec, is being carried on by several parties. Numerous locations have been staked. The Wood mine, now controlled by C. A. Foster, is being diamond drilled.

Operations in the Lake Keewagama district have been resumed by St. Maurice Mines Ltd.



**PERSONAL.**

Mr. W. W. Mein is at The Pas, Manitoba.

Mr. B. W. Knowles succeeds Mr. W. Sampson as superintendent of the Nickel Plate mine, Hedley, B.C.

Mr. A. L. Meuche is expected in Toronto this week. He will visit mines in Northern Ontario.

Mr. C. A. Foster, who recently acquired control of the Wood Molybdenite mine at Quyon, Quebec, is at Ottawa.

Mr. A. M. Hotchkin, formerly of the Tough-Oakes staff, is now at Quyon, Quebec.

Mr. P. Crane, of Greenwood, B.C., superintendent of the Canada Copper Corporation's Mother Lode mine, has been on a visit to Seattle, Washington.

Mr. Thos. French, of Nelson, B.C., in charge of the electrolytic zinc plant the French Complex Ore Reduction Co. has for some time past been installing at that place, was in Spokane, Washington, last month.

Mr. Jay P. Graves has returned to Spokane from a recent visit to the Granby Consolidated Co.'s mines and smelting works near Anyox, Observatory Inlet, B.C. For many years Mr. Graves was vice-president and general manager of the Granby Co. until health considerations necessitated his retirement from that responsible position.

Mr. Lashley W. Hope, for the last year superintendent of the Yankee Girl mine near Ymir, Nelson mining division of British Columbia, has returned to Nevada.

Mr. Thos. Kiddie, after spending two or three weeks in Vancouver and on Vancouver Island, has gone back to Southern California. During his brief stay on Vancouver Island he visited the smeltery at Ladysmith, which works he designed and erected for the Tyee Copper Co., and for some years was in charge as superintendent.

Mr. Oscar Laehmud, general manager for the Canada Copper Corporation, operating copper mines and smelting works in the Boundary district of British Columbia, and developing a large group of copper claims in Similkameen district of that province, was in San Francisco lately.

Mr. Clifford Smith has returned to South Porcupine to install a power plant and lay out further development on the Aukerite property, for the Coniagas Mines.

Mr. F. S. Norcross, Jun., of Copper Mountain, near Princeton, B.C., superintendent of mines for the Canada Copper Corporation, recently made a business visit to Seattle, Washington.

Mr. R. K. Neill, of Spokane, formerly prominently identified with the development of the Hudson Bay zinc mine, in the southern part of Nelson mining division of British Columbia, is now engaged in developing a mining property in Portland Canal mining division of that province.

Mr. Dale L. Pitt, field engineer for the Tacoma Smelting Company, which smelts the greater part of the custom ore from the northern Pacific Coast districts, has been giving much attention lately to productive mining districts in British Columbia.

Mr. Floyd W. Parsons, of New York, editor of Coal Age, has returned to that city from a trip to the Northwest, in the course of which he visited British Columbia.

Mr. F. H. Skeels, of Nelson, B.C., has resigned as superintendent for the Kootenay Gold Exploration Co., operating the Granite-Poorman group of mines and 20-stamp mill near Nelson, to take charge of mining in the Coeur d'Alene district of Idaho.

Mr. Thos. R. Stockett, for a number of years and until quite recently manager for the Western Fuel Company, of San Francisco, owning large coal mines in Nanaimo district of Vancouver Island, has been examining coal-mining properties in Nicola Valley district, B.C.

Mr. Bruce White, of Sandon, Slocan, left British Columbia last month on a visit to Toronto.

Mr. W. R. Wilson, of Fernie, B.C., general manager for the Crow's Nest Pass Coal Co., was in the neighborhood of Stewart, Portland Canal mining division of that province, about the end of July, looking into some metalliferous mining interests there.

Mr. Clyde A. Heller, of Philadelphia, president, and Mr. F. Bradshaw, of Tonopah, Nevada, general manager of the Tonopah-Belmont Development Co., late last month were in Vancouver, B.C., on their way to Surf Inlet, Princess Royal Island, to investigate progress being made there by the Belmont-Canadian Mines, Ltd., in developing a gold mine and putting in a hydro-electric power plant and a mill.

Mr. John V. Rittenhouse has returned from New York city to Omineca mining division of British Columbia, in which he is interested in iron and other mineral claims.

**MAPPING CAIRO AND POWELL TOWNSHIPS.**

Mr. A. G. Burrows of the Ontario Bureau of Mines is making a preliminary examination of the townships of Alma, Baden, Cairo and Powell, a new gold area in Northern Ontario. Mr. H. C. Cooke of the Geological Survey of Canada is working to the west of the area.

**THE IRON ORES OF LAKE SUPERIOR, by Crowell and Murray, Penton Press, Cleveland.**

This is the third edition of an excellent handbook on the iron ores and iron mines of the Lake Superior district. The matter has been brought up-to-date and new features added.

The chapter headings are: Early history, geology, mineralogy, production, dock equipment, classification of ores, valuation, beneficiation, methods of analysis, geology of Wakefield area, development of Cuyuna range, description of mines and ores with maps, index to mines and ores.

**THE MINING MANUAL AND MINING YEAR BOOK, 1917, by Walter R. Skinner. Published by W. R. Skinner and "The Financial Times," London. Price 20s net.**

This well known publication is consulted in all parts of the world for information on mines. The new edition is an excellent compilation of up-to-date matter. While full particulars are supplied of 1710 companies, the supplementary index, with its references to earlier volumes, covers no less than 2,286 additional companies. Alphabetical lists of mining directors, secretaries, engineers, and mine managers, with their addresses and the names of the companies with which they are connected, are as usual appended to the book. These lists are supplemented by an up-to-date dictionary of mining terms, which is yearly revised in order to include the fresh puzzles set mining operators by the extension of enterprise to new fields, where unfamiliar currency, weights, etc., are employed. For instance, the explanation of the terms used in the reports of Russian mining enterprises will be found particularly helpful.



## SPECIAL CORRESPONDENCE

### NORTHERN ONTARIO.

#### McIntyre.

At the present rate of production, August figures for the McIntyre-Porcupine Mining Company will set a new high record for this property. During the fifteen months ended June 30th, and which will be covered in the annual statement of the McIntyre-Porcupine to be issued in the near future, it will be shown that the company treated approximately 195,837 tons of ore from which \$1,885,943 in bullion was recovered. Of this amount \$1,449,231 was recovered during the twelve months period ending March 31st, and the balance, \$436,712, in the extra three months, April, May and June.

A remarkably good recovery has been obtained and the costs of milling are very low. The recovery averaged 95 per cent., while the milling costs were less than 90 cents per ton. Mining costs were fairly high, owing to the large amount of development work done. The average recovery from the ore treated was about \$10 per ton, resulting in a profit of approximately \$4.25 per ton, netting the company a total profit for the fifteen months' period of around \$822,307. During the year 1915, McIntyre produced only \$101,955 and during 1917 the production should be nearly two million dollars. Within another year it is expected that the milling capacity of the property will be almost doubled, which will allow for still greater expansion.

Ore reserves have been added to at a very rapid rate, owing to the very satisfactory results obtaining at the 1,000-ft. level, where a large orebody carrying very high grade milling ore has been developed. This orebody extends from the original McIntyre property, across the McIntyre extension and at the present time the face of the drift is in the Jupiter portion of the McIntyre territory, where the face of the drift is about 55 feet in width. Since entering the Jupiter the vein has split into two sections; one of these is about 12 feet in width and carried ore which assays \$200 to the ton across this width, the remainder of the vein is averaging around the usual run of the vein which varies from \$10 to \$20 to the ton. Owing to the inefficiency of the labor available for mining at the present time the McIntyre, in common with all the producing mines of the North, has been seriously handicapped. However, in point of numbers the McIntyre has been fortunate in regard to its supply of labor, which in a great measure makes possible the wonderful results of the past fifteen months' work.

#### Vipond.

At the 600-ft. level of the Porcupine V. N. T. property what appears to be one of the best ore shoots so far encountered at the mine is being opened up. Where encountered on the North Thompson portion of the property the vein was around 20 feet in width and carried values of \$15 to the ton; the drift has since been driven over 60 feet and the vein is maintaining both its width and values. Some of the ore being obtained at this working is exceedingly spectacular, which leads to the belief that it will ultimately be possible to maintain much higher mill heads. The present mill is treating 100 tons per day, and the heads are ranging around \$10 to the ton. All mill feed at the present time is being drawn from the mine and the large tonnage on the dumps is being kept in reserve. On the return to more normal conditions in the supply of labor, the company propose the erection of a 400-ton mill.

The Vipond consists of about 160 acres and lies in a portion of the camp where it should benefit considerably by successful developments along the south side of the Hollinger Consolidated, and also by favorable results in the development of the Porcupine Crown. Recent developments in drifting on the main vein from the 600-ft. level of the North Thompson have disclosed the probability of this being an entirely different vein to that which is in evidence at the same level of the old Vipond property, with the result that this vein is expected to pass some considerable distance to the north of the old Vipond working. It was at first supposed that the drift on the vein from both these workings would connect, but it is now believed that they are two distinct orebodies. It might also be mentioned that diamond drilling has proven the existence of two other parallel veins further north, and it would now appear that instead of one main vein on the property there are four veins at least on the Porcupine V. N. T.

#### Hollinger Consolidated.

Development work on the Hollinger Consolidated is being carried on at a maximum these days, and production is also on the upward trend. Approximately one mile of underground work is being done per month, and development work is being pushed forward at one hundred different faces. Every level from the surface to the 1,250-ft. is being opened up and about 40 machines are engaged on the work, with the result that it is expected the ore reserves at the end of the current year will show a considerable increase. Heretofore reports on ore reserves at this mine did not include anything below the 900-ft. level, and the decision to resume developments at the 1,250-ft. depth is of more than ordinary interest. Current production returns are said to be a good deal higher than for many weeks past, and it is altogether probable that from this time forward a steady improvement will be recorded at the big mine.

#### Schumacher.

The cement foundations are now in place and the framework of the building is under construction to house the 400-ton mill which it is expected will be in operation at the Schumacher mine by September. The machinery for this new mill was ordered some time ago and is now on the property ready for installation. It is anticipated that on the resumption of operations at the mill it will not be possible to run at full capacity, but that it will be possible to treat upwards of 300 tons per day, owing to the difficulty in securing labor to keep up the ore supply. A good deal of repairing has been done at the mine since the curtailing of active mining operations some weeks ago, which will greatly facilitate the handling of ore underground. A new power house has been built and two new transformers have already been installed. The building has been so constructed as to allow of the installation of additional transformers as required, room for six being arranged for with an aggregate capacity of 1,200 h.p. It is expected that with the higher grade of ore encountered in the south orebody at the Schumacher it will be possible to increase the mill heads to about \$7 per ton. Up till the present time the value of the ore treated has averaged around \$6 to the ton. The ratio of costs as compared with the present milling system will be greatly reduced and it is expected that the treatment of the 300 tons of ore per day in the new mill will just about double the present milling costs, with the result that with the increased value of the ore it should be easy for the company to increase



its profit to \$30,000 a month or \$360,000 annually, when the new mill is in operation.

#### **Plenaurnum.**

Diamond drilling is being carried on on the Plenaurnum property at Poreupine, which is under option to the McIntyre mines at the present time. It is intended to explore the ground at the 1,000-ft. and deeper levels to determine if the veins of the Jupiter property extend into the Plenaurnum. Diamond drilling is also being done on the Jupiter property by the same company.

#### **Porcupine Crown.**

Arrangements are being made for the exploration of the Porcupine Crown mine at deeper levels and at the present time a winze is being sunk from the 900-ft. level to the 1,000-ft. and will be continued to the 1,100-ft., at which levels considerable development work will be undertaken. Some of the richest ore ever taken from this mine came from the lower workings, and with this in view the continuation of the work to deeper levels leaves reason for much optimism regarding the future of Porcupine Crown. The Porcupine Crown has paid a total of \$780,000 in dividends and has paid a three per cent. quarterly dividend since the beginning of the year 1914. At the beginning of the present year the ore reserves at the mine were estimated at a little over one million dollars, which would keep the mill in operation for the next two years. With developments at present under way it is considered very probable that these ore reserves will show a considerable increase. Notwithstanding the labor shortage throughout the district the Porcupine Crown is in a physical condition quite on a par with any other time in its history.

#### **Ontario Western.**

A new company, known as the Ontario Western Mining Company has been organized to take over five claims in the Boston Creek mining district. Two of these claims are located in the township of McElroy and adjoin the group recently optioned to interests closely identified with the Buffalo Mining Company of Cobalt, while three of the company's claims are located in Boston township close to the Charette group, on which considerable free gold has been discovered. The company has a capitalization of \$25,000, divided into 250 shares of \$100 each. At the present time development work consists of trenching and stripping during the course of which a number of promising veins have been uncovered. Plans for more extensive operations are being arranged.

#### **Croesus.**

The work of de-watering the Croesus mine in Munro township is proceeding and it is expected that the difficulty from the flooding of the lower workings through encountering a water seam will be definitely dealt with in the course of the next week. A cement bulk-head will perhaps be installed to shut out the water. The mill is being kept running on ore from the dump.

#### **Larder Lake.**

A telephone line has been completed from Dame to Larder Lake, which connects this mining camp with the larger business centres of the north country, and often eliminates the hitherto necessary stage journey of twenty miles which separated that camp from the railway. The Larder Lake Goldfields mine is getting operations under way and it would appear a promising future is opening out for this district.

#### **Bourke's.**

A number of prospects in the vicinity of Bourke's Siding are standing up well under development. A company has been formed to work the property known as the Anderson farm, which was under litigation recently, and developments are understood to be very favorable here. The nearest actual mining development of any importance to Bourke's is on the Murray-Mogridge property at Wolfe Lake, which is about three miles south-east. Present indications, however, point to considerable activity in the district in the near future.

#### **Kirkland Lake.**

The crosscut to tap the vein of the Kirkland Lake gold mine at Kirkland Lake is well under way. There are only four deeper gold mines in the north country than this one, which has the distinction of being the deepest working in the Kirkland Lake camp. The four deeper gold mine workings in the north country are to be found at the Hollinger, McIntyre, Porcupine Crown and Dome Mines. In the Kirkland Lake the Tough-Oakes comes second and the Teck-Hughes third.

#### **White Reserve.**

Encouraging results are being encountered at the 140-ft. level of the White Reserve mine in the Maple Mountain district. A number of veins have been opened up in which fair values occur. Some high grade ore was recently found in a vein about two inches wide, and generally speaking, the lateral work which is being done is proving very satisfactory.

#### **Elliott-Kirkland.**

The trouble from the flow of water which was struck at the 165-ft. level of the Elliott-Kirkland property last month has been overcome and operations have again been resumed. The shaft will be continued to the 300-ft. level, where a crosscut will be run to encounter the vein which it is expected continues from the Kirkland Lake gold property into the Elliott-Kirkland, and determine its values at this depth. About 185 feet of crosscutting will be necessary.

#### **Black Claims.**

Operations will be resumed shortly on the Black claims at Kirkland Lake which lie close to, on the south of, the Tough-Oakes and Wright-Hargraves properties. A shaft has been sunk to a depth of over one hundred feet and promising results have been met with.

#### **Lake Shore.**

The new vein recently encountered at the 200 ft. level of the Lake Shore property at Kirkland Lake has faulted. As yet the nature of the fault has not been definitely determined. Some three hundred feet of drifting, two hundred feet of which had been in high grade mill ore, was accomplished before the fault occurred. Sinking of the shaft to the 400-ft. level is now being proceeded with and a crosscut will be run to the north from this depth to determine whether the vein continues beneath the conglomerate which at this point is about three hundred feet in depth.

#### **Fisher.**

The Fisher property at Kirkland Lake taken over a short time ago by Montreal interests is to be actively developed in the near future. A force of men are to commence the erection of camp buildings at an early date.

#### **Gold Discovery in Rickard**

While cruising for pulpwood in the township of Rickard, two Swedes accidentally came across what appears to be an important outcropping of gold bearing



quartz. The scene of the new discovery which caused a small sized rush, is about twelve miles east from Iroquois Falls and about four miles south from the Abitibi River. The outcropping of rock is very limited, being less than one square mile in extent. A number of veins were discovered, one of which is said to be over twenty feet in width and to carry very high values. The property on which the original discovery was made has been optioned to Haileybury interests for a sum said to be well up in six figures and active development is to be commenced as soon as a working permit can be secured. A large number of veteran claims are situated in this district and there was a very small portion of the country that was available for staking. All has been staked.

#### Boston-Hollinger.

The Boston-Hollinger property at Boston Creek has changed hands and an aggressive plan of operations has been outlined which will be commenced at once. The purchasers, who have had considerable experience in mining in British Columbia, represent one of the largest manufacturing concerns in the province of Quebec. The intention of the new owners is to install an up-to-date mining plant and the initial operations will consist in sinking a shaft to the 200-ft. depth. A road is being cut from the railroad to the property, a distance of less than a mile. Manager Charles O'Connell of the Tough-Oakes examined the property for the purchasers. A substantial cash payment is understood to have been made, and the total purchase price is said to run well up into six figures. Owing to the richness of the surface showings on the property a great deal of interest is being taken in the developments.

#### Huronian.

It is learned from a reliable source that the Huronian mine in Gauthier township will be again re-opened. A short time ago the property changed hands, and it is probable that it will be extensively developed. The results of diamond drilling done by Timmins interests some two years ago determined the existence of more or less substantial orebodies on the property. The property lies about twelve miles east from the Tough-Oakes mine at Kirkland Lake.

#### Mining Corporation.

During the week ended July 30th, the Mining Corporation of Canada shipped out of the Cobalt camp over three hundred thousand ounces of silver, valued at nearly a quarter of a million dollars. Owing to the continued high quotation for silver a very aggressive policy is being followed at this property. The shipments for the week from this mine were made up as follows:

Bars.	Ounces.	Value.
191	199,934	\$167,070
101	100,816	82,228

Besides this amount of bullion three car-loads of ore were shipped which contained 195,722 pounds.

#### Nipissing.

In July the Nipissing Mining Company issued the following financial statement:

Cash in bank .....	\$1,662,200.05
Value of bullion and ore in transit and at smelter .....	184,508.13
Value of ore on hand and in process and bullion ready for shipment .....	733,195.00
Total , , , , ,	\$2,579,903.18

On August 21st a meeting of the shareholders of the Nipissing Mines Company will be held for the purpose of voting on a proposition made by Nipissing Mine Company, Ltd., an Ontario corporation, to purchase all the capital assets of this company. The object is to re-incorporate the company in Canada under the same charter and by-laws as nearly as practicable, and with the same officers and directors and with the same capitalization which is \$6,000,000 divided into 1,200,000 shares of the par value of \$5 each. The stockholders of the company will receive share for share in the new Nipissing Mines Company, Ltd., of Ontario, for their present holdings in the Nipissing Mines Company, the latter company which will thereupon be dissolved.

#### La Rose.

The half-yearly statement of the La Rose Mines recently issued shows the financial position of that company fairly strong but to be on a gradual decline. The net surplus is now \$640,180, as compared with a surplus brought forward from 1916 of \$727,169, and with \$926,644 from the year 1915. The following is a summary of La Rose finances.

Cash surplus .....	\$579,949.50
Ore in transit, etc.....	86,668.52
	<hr/>
	\$668,618.02
Less current liabilities..	28,437.08
	<hr/>
Net surplus .....	\$640,180.94

#### BRITISH COLUMBIA.

The resumption of work in the coal mines and at the coke ovens of the Crowsnest district of Southeast Kootenay and the neighboring coal mining region of Southwest Alberta, is having a beneficial effect on the mining industry of the Kootenay and Boundary districts of British Columbia, for with coke again obtainable for the smelting works at Trail, Grand Forks, and Greenwood, respectively, production of ore on a larger scale than has been practicable during the last three months, may be expected to be an early result. It is not to be expected that a return to the flourishing conditions that prevailed at the time labor troubles arrested progress several months ago will be immediate, for quite a number of men who were thrown out of employment at some of the metalliferous mines when it was found necessary to temporarily suspend taking out ore left the several districts affected by the stoppage of smelting operations when the coke supply gave out. Yet the fact that activity again prevails at the larger mines will induce many men to return, and eventually, it is believed, things will again be running in their regular course in the chief mining camps of the interior of the province.

The total of dividends already paid in 1917 by metalliferous mining companies operating in the province has exceeded \$2,000,000, as compared with \$2,800,946 for the whole of 1916, and 1,586,820 for 1915. The 1917 total includes the third quarterly dividend of the Granby Consolidated Co., payable at the beginning of August. The several amounts making up the total are approximately as under:

Consolidated Mining and Smelting Co.....	\$ 471,142
Granby Consolidated M. S. & P. Co.....	1,124,887
Hedley Gold Mining Co. ....	120,000
Le Roi No. 2. Ltd. ....	29,220
Rambler-Cariboo Mines, Ltd. ....	35,000
Standard Silver-Lead Mining Co. ....	200,000



Utica Mines, Ltd. .... 32,000

Approximate total to August, 1917.... \$2,010,249

#### East Kootenay.

Apart from the continued large output of lead-zinc ore from the Consolidated Co.'s Sullivan mine, there is little of importance to chronicle in connection with metalliferous mining in East Kootenay district. Some miners who have leased a part of the St. Eugene lead-silver mine near Moyie, in Fort Steele division, have made a carload shipment of ore to Trail, while the total shipped this year by the company is now nearly 900 tons. The Burton property, near Elko, west of Moyie, is expected to produce more ore later in the year, Alberta men having acquired it and, with Mr. J. L. Parker in charge, made preparations to work it. Little ore has been produced in recent weeks from mines in either Windermere or Golden division. It is expected those divisions will have made a better showing, as regards output, by the end of the autumn.

#### West Kootenay.

**Rossland and Trail.**—Production of ore on a large scale has not yet been resumed at mines in Rossland camp, the total quantity shipped to the Consolidated Co.'s smelting works at Trail having been 994 tons during the month of June and 308 tons in the three weeks ended July 21st. Of the June output, 827 tons was from the Consolidated Co.'s Centre Star group of mines and 167 tons from its Le Roi mine. The July production shown above was from the Centre Star group only. A few cars of ore have been shipped from the Josie group of the Le Roi No. 2, Ltd., to the smelting works at Ladysmith, Vancouver Island, but this is probably only a temporary arrangement pending receipt at Trail of sufficient coke to warrant the blowing in of the copper furnaces there.

On July 27 the Trail News stated that on or about August 1 one copper furnace would probably be in blast, perhaps more furnaces than one, as coke supplies were coming in with some regularity; also that the total of ore receipts for the week ended July 21, of only 2,544 tons, was about the smallest weekly total for the last two years, a car barge on Kootenay Lake having temporarily gone out of use and thus interfered with the transportation of ore en route from the Sullivan mine, East Kootenay.

Monthly totals of ore received at Trail during the first half of 1917 were as follows: In January 36,570 tons, February 40,967 tons, March 43,979 tons, April 24,909 tons, May 15,939 tons, June 17,129 tons; total for six months, 179,493 tons, which compares with 245,466 tons for the corresponding period of 1916. While the total for July may be smaller than that for June, it is expected that there will be a gradual increase thereafter until receipts shall again be comparatively large.

**Revelstoke.**—The Montgomery group of nine mineral claims, situated in the neighborhood of Downie creek, about 40 miles north of Revelstoke, in the Big Bend region of Revelstoke mining division, is reported to have been bonded to the Granby Consolidated M. S. and P. Co., one of whose mining engineers, Mr. M. E. Nelson, is to superintend development work about to be undertaken. It is stated that there are on the property big showings of copper-gold ore.

The ore receipts at Trail for the week ended July 21 included 29 tons from the Lanark mine, Meechlaet, along the main line of the Canadian Pacific Railway east of Revelstoke. Another small lot, of 41 tons, was

received from the same mine early in May. It is of interest to recall that the first production of ore in quantity from a lode mine in British Columbia was stated "to have been made by the Selkirk Mining and Smelting Co., which in 1887 and 1888 shipped to a smeltery in San Francisco, California, 422 tons of sorted silver-lead ore from the Lanark mine, where a small crushing and sampling mill had previously been put in." One lot of 64 tons of ore shipped by the present operators of the mine shortly after they bonded it was officially averaged 34 per cent. lead and 33 oz. silver to the ton, while 32 tons averaged 29 per cent. lead and 26 oz. silver to the ton. Last year's shipments to Trail totalled 415 tons. An aerial tramway, 6,900 ft. in length, in two sections of 3,600 and 3,300 ft., respectively, was constructed late in the Autumn of 1915 from the railway up to the mine, the difference of elevation between terminals being about 2,600 ft. The mining recorder for Revelstoke division, in his official report for 1916, made public last month, gave the following information relative to the Lanark mine.

"The owners have been sinking shafts and drifting to prove the occurrence of enough ore for a plant they are erecting. The ore in the lower levels contains so much zinc that they find it necessary to make a concentration. They are erecting a modern mill of 75 tons a day capacity. They have about 15,000 tons of ore in sight, which is expected to average about 7 to 8 per cent. lead and 12 to 15 per cent. zinc."

As in many other instances of reopening of mines in Kootenay district long inactive, the enterprising men who are now working the Lanark are Spokane men, and they expect to be successful in this enterprise.

#### Boundary.

On Friday, July 20, the Gazette, published at Grand Forks, where is situated the big copper smeltery of the Granby Consolidated Mining, Smelting, and Power Company, printed the following statement: "Coke shipments from the Fernie (Crowsnest) ovens to the Granby Co.'s smelting works, did not come up to expectations, so resumption of operations has been somewhat delayed. It had been hoped to have blown in four furnaces today, but this has been postponed until Monday. Quite a number of men have been at work this week at the smeltery getting things in readiness for blowing in. At the company's mines at Phoenix, the full force of miners are now being put to work and two shipments of ore reached the smelting works this week. While there is likely to be a temporary shortage of labor at the mines, the Granby Co. has about 10,000 tons of ore at Phoenix ready for shipment. The Fernie and Michel ovens, which supply coke to the Granby Co.'s works, are turning out about 400 tons a day, approximately 50 per cent. of the normal output which is expected to be reached in about thirty days. Small shipments of coke from the ovens of the International Co., at Coleman, Alberta, which supply the smeltery at Greenwood, have been commenced, and it is expected they will be running at full capacity in thirty days.

#### General Notes.

In a published account of a meeting held in the Board of Trade Hall, Victoria, on July 30, at which addresses were delivered by three members of the Advisory Council for Scientific and Industrial Research, one member, from Montreal, is reported to have stated that "the finest tungsten deposits of the Dominion are to be found on the northern borders of the Pacific province."



News from Prince Rupert is to the effect that Mr. H. N. Witt, representing the Goldfields Consolidated Mining Co., of San Francisco, Cal., has been examining a group of mineral claims on Salmon River, in Portland Canal mining division, and that a contract had been let for driving an adit 200 ft. farther, on Mr. R. Martin's property on Seven-mile creek. Mr. R. K. Neill, of Spokane, who has for several years been associated with others engaged in developing mines in West Kootenay district, is also doing some exploratory work on a mineral claim in the same mining division.

A press despatch sent out from Vancouver states that gold bullion deposited in the Dominion of Canada Assay Office in that city in 1917 up to July 19 amounted in value to \$1,669,149.37, as compared with \$965,157.54 during the corresponding period of 1916, thus showing an increase of \$703,991.83. Comment is added that the first half of the year is only the early part of the gold-producing period; in some districts the season has only lately been begun, so from the present on for several months the heaviest receipts of gold for the year are expected.

The Rossland Miner lately published news from Northport, Washington, where is situated the smeltery long owned by the Le Roi Mining Co., established with the chief object of smelting ore from the Le Roi and other Rossland mines, as follows: "Activities at the Northport smeltery indicate that plans to gradually enlarge the plant by various new buildings and departments, and probably by additional blast furnaces, are under way. The large machine shop and the electric power-house are nearing completion. Electric power is being brought in from the plant of the West Kootenay Power and Light Co. at Bonnington Falls, B.C., and much money is being expended on the smoke condenser. Room is being made for more furnaces. Meanwhile, the mines and mining prospects of the surrounding district are being developed, and in due time ore from these properties may tax the present capacity of the plant."

### ALBERTA OIL COMPANIES.

Calgary, July 28.—The first financial statement of the Southern Alberta Refineries, Limited, has just been issued, which shows a most satisfactory condition of affairs. The directors recommend the payment of a 10 per cent. dividend on all shares on record July 30, 1917, and an additional 5 per cent. on all shares issued before June 30, 1916. This company has therefore earned for itself the proud distinction of being the first oil concern in western Canada to pay a cash dividend.

William Livingston, the president and managing director, states that practically all of the sales of gasoline have been made since last September when No. 1 well was cleaned out, and show a total of over \$75,000. After deducting operating expenses, the financial statement shows a gross profit of \$21,035, and a net profit of \$12,493. The bank balance is over \$21,000.

A. W. Dingman, in the course of a brief interview with The Herald this morning, expressed much satisfaction with the financial statement of the Southern Alberta Refineries. Tentative arrangements had been made, he said, to purchase any oil from the Alberta Consolidated company as soon as that well had been cleaned out, which he anticipated would be at an early date. At the moment he could not, of course, hazard an opinion as to the probable quality of oil that would be produced from the well.

Speaking of the work at the Calgary Petroleum company's refinery, Mr. Dingman stated that the immediate proposition was the fitting up of machinery to extract the gasoline from the crude product. American associates of the company on the other side of the line expected to ship this machinery now in the course of a few days. With regard to the quality of oil at the present time at their wells, Mr. Dingman stated that carload lots were periodically being sent forward.

Mr. Dingman is as optimistic as ever over the future of the Alberta oil fields. They were now down 3,900 feet, he said, and he was convinced that it was at about this depth that large quantities of oil would eventually be found.

### THE TASHOTA GOLD DISTRICT, ONTARIO.

By R. C. W. Lett.\*

I recently spent a few days at Tashota, Ontario, for the purpose of ascertaining, as far as practicable, whether or not Tashota is, or ever will be, a mining camp.

It has often been said that neither the scientist nor the prospector can see down any distance through rock and muskeg. Therefore, as the matter stands at Tashota, we cannot say whether the camp will stand up under development. We do know, however, that nearly every vein so far located and tested, carries gold values. These run from traces up to \$600 per ton.

Possibly more publicity would have been given to this district, if it were less accessible. Where strikes are generally made, they are beyond transportation facilities, oftentimes at the end of a brutal trail. A rough, hard trail seems to add to the lure.

To reach Tashota, which is in the Kowkash mining division, Ontario, one may board the G. T. P. train here at Winnipeg at 5.15 in the evening, and at 8.36 the following morning, find himself in the very heart of the mining camp, where claims are to be seen on both sides of the railway track. Never before has a gold-mining camp been established under such favorable transportation conditions.

Let us go back to the early history of the district. A spectacular gold find was made by E. W. King Dodds on August 21st, 1915, nine miles northwest of Kowkash, which lies east of Tashota. This was near Howard Falls, on the river Kawa-Kash-Kagama, which signifies sparkling water, now corrupted to Kowkash.

Years before, however, the region was explored by the Geological Survey, and W. H. Collins in 1909 made a report, and his description of the rock formation may have had something to do with attracting the prospectors' attention to the Nipigon country. Mr. A. P. Coleman's report likewise was valuable. More attention, however, at that time, was given by the prospectors in their search for iron, which, although present in that area, has not yet been discovered in economic values.

Robert Bell, in a report to the Geological Survey in 1870-71, and again E. G. Neelands, Geologist, 1900, paved the way for the prospector, when he stated, "Huronian (Keewatin Rocks), mainly chlorite and other soft green schists occur in the Kawa-Kash-Kagama River for about four miles below Wa-Wong Portage (Howard Falls)."

Gold at that time was found in small quartz veins. It was therefore not surprising that King Dodds made his discovery. Like many others, it was accidental. This man was walking over a rocky hill below Howard Falls (the rocks had been burned clean of moss and trees on the previous day) and found gold in the veins

\*Tourist and Colonization Agent, G. T. P.



which ran through the rock. Immediately there was a rush of prospectors to that district.

It appears that some of the veins in the district, while exceptionally rich, were small and did not bear up as to values. There are about 1,000 claims staked in the district of Kowkash. Most of these are near Tashota, and, judging from the formation, which is very similar to that of Porcupine, there is every likelihood that a few good mines may be developed.

It will be found interesting to review the first good discovery at Tashota. Section Foreman Wells of the Canadian Government Railways at Tashota, used to accommodate in any way he could the prospectors who were first upon the ground. He looked after their outfits, keeping them safe until called for. In return for this kindness, a few of the boys staked a claim for Wells, close to the great gravel-pit, a little better than a mile from the station of Tashota. The only indication on his particular claim was a small out-cropping of rock through which an ordinary vein ent. The boys put in a shot, which merely blew out some fragments of rock from the vein. The second shot exposed native gold, and when they made the suggestion that another shot be put in, Wells objected, saying, "Maybe you will blow out all my gold, and then I can never sell my claim."

Not long after this a syndicate from Baltimore and Buffalo under the management of Mr. John Orn, purchased the Wells claim from him for \$25,000. Wells no longer pumps a hand ear. A working mine now exists, where was only a patch of timber and rock. The Tash-Orn people have sunk a shaft 130 feet, have drifted at the 100-foot level, and are sinking another 100 feet. Instead of the gold petering out in this vein, values averaging \$14 per ton have carried the entire depth sunk. When I visited the Tash-Orn there were 60 men employed at the camp, and the value of the ore on the dump was calculated to be worth \$100,000.

Another claim inspected was the Ross claim. The Trethewey people, so well known in Cobalt and Porcupine, were busy stripping and testing a very large vein, which could be traced for about 1,000 feet. Their engineer, Mr. McReavy, informed me when I visited this vein, that his average assays ran \$12 per ton. On the Devaney claim, which is directly north of the station, a little better than half as distant, I found a very large quartz vein carrying values in tellurides, which in that district are good indications. The gold value assays of this claim ran from \$8 to \$80 per ton.

I visited many other claims; but in no instance was I at a greater distance than four miles from the station at Tashota. We know of other camps which promise great things, but when the question of transportation is considered, development would appear to be a long way off. In this case the railroad is in the heart of the camp.

I would class the majority of the prospectors at Tashota as reliable and I have had many a heart-to-heart talk with quite a number of these fine chaps (who, by the way, would look upon you with suspicion if you passed their cabin door and failed to enter for a meal). They, one and all, gave it as their candid opinion that the country looked better to them than Porcupine. The formation was the same and the leads were stronger.

I find that Mr. P. E. Hopkins of the Ontario Bureau of Mines, Toronto, spent a portion of last year, when the first discovery was made, in and about Tashota. The department at Toronto thought well enough of the district to open up a recording office at Tashota, which

is still in existence and in charge of Mr. Morgan.

Mr. Hopkins made a report, which was published last year, but I do not think it is as valuable as a report of his which will be published in August of this year. Mr. Hopkins has returned to Tashota and will spend, I understand, all summer in the district.

Mining facilities at Tashota are as good, if not better than the average. There is sufficient small timber to furnish material for light crib-work, etc. The heavier dimension timber, boards, shingles, etc., are shipped in from Hearst.

There are no water powers, as the country has been glaciated, and lies for the most part very flat. The water question, however, is most satisfactory to many of the claims, for the reason that a small stream cuts through the district, draining a few small lakes and eventually flowing into Lake Nipigon. This stream is navigable part of the season for canoes.

At Topsy Lake, named for G. E. Metcalfe (Topsy) by Mr. Hopkins, there are located on the southwest shore of the lake a few claims which I inspected. On K. K. 234 King, I was particularly interested in a very large quartz vein, which appeared to strike northwest and southeast, and easily traced to the water's edge, a considerable distance from discovery post. Samples which were collected from the surface assayed more than a trace of gold.

What the district now needs is working capital. I have had letters from some of the prospectors at Tashota offering reasonable opportunities for sporting chances for investment in part interests in their claims.

I think that more publicity should be given to the camp and attention of mining men and capitalists should be drawn to the district of Tashota, for I feel it is worthy of notice, and in the event of the camp proving up, we may expect a considerable revenue to develop for our railway.

### RE-EXAMINING PHOSPHATE BEDS.

Calgary, July 18.—Prof. Frank D. Adams of the advisory council for industrial research, one of the best known geologists of the Dominion, left Calgary for Banff on Wednesday morning to investigate the existence of phosphate deposits near that place. It is reported that the deposits are very large in extent and that they may be of great commercial value.

On Tuesday, when asked about the possibility of commercial phosphate deposits at Banff and their value, Prof. Adams said that this form of phosphate rock was very valuable as a fertilizer, but that in the form it existed at Banff, as he understood it to exist from what he had so far heard, the commercial value of the deposit was doubtful at the present time.

When the geologist returns, however, it is probable that he will have a more complete statement to make.—News Telegram.

### COPPER ORE SHIPMENTS.

Whithorse, July 20.—The freighter Redondo of the Alaska Steamship Co. left Skagway last week with over 1,000 tons of copper ore from Whithorse Copper Camp, consigned to outside smelters. The shipment was divided up as follows: Valerie, 700 tons; War Eagle, 125 tons; Grafton, 85 tons; Copper King, 65 tons; Anaconda, 35 tons.

Some of the ore shipped had been lying in the bunkers at Skagway for a considerable length of time and there is still a large quantity remaining there awaiting transportation.



## MARKETS

## SILVER PRICES.

	New York.	London.
	cents.	pence.
July 24 .....	78 $\frac{5}{8}$	39 $\frac{7}{8}$
" 25 .....	78 $\frac{3}{8}$	39 $\frac{3}{4}$
" 27 .....	78 $\frac{1}{8}$	39 $\frac{5}{8}$
" 30 .....	78 $\frac{1}{8}$	39 $\frac{5}{8}$
" 31 .....	78 $\frac{5}{8}$	39 $\frac{7}{8}$
Aug. 1 .....	79	40 $\frac{1}{8}$
" 2 .....	80	40 $\frac{5}{8}$
" 3 .....	80 $\frac{3}{4}$	41
" 4 .....	80 $\frac{3}{4}$	40 $\frac{3}{4}$
" 6 .....	80 $\frac{3}{4}$	Holiday

## STANDARD MINING EXCHANGE.

(As of close August 9, 1917))

## Silver.

	Asked.	Bid.
Adanac .....	.16	.15 $\frac{3}{4}$
Bailey .....	.04	.03 $\frac{3}{4}$
Beaver .....	.33 $\frac{3}{4}$	.33
Buffalo .....	1.50	1.25
Chambers-Ferland .....	.14 $\frac{1}{2}$	.13 $\frac{1}{2}$
Coniagas .....	4.00	3.50
Crown Reserve .....	.26	.20
Foster .....	.04 $\frac{1}{2}$	...
Gifford .....	.05 $\frac{1}{2}$	.05
Gould Con. ....	.00 $\frac{3}{8}$	...
Great Northern .....	.07 $\frac{3}{4}$	.07 $\frac{1}{2}$
Hargraves .....	.11 $\frac{1}{2}$	.11
Hudson Bay .....	40.00	38.00
Kenabeek .....	.20	.18
Kerr Lake .....	...	4.95
Lorrain .....	.10	...
La Rose .....	.47 $\frac{1}{2}$	.46
McKinley-Darragh .....	...	.52
Nipissing .....	7.80	7.70
Ophir .....	.09 $\frac{1}{2}$	.09
Peterson Lake .....	.11	.10 $\frac{1}{2}$
Right-of-Way .....	.05	...
Rochester Mines .....	.05	...
Shamrock .....	.21	...
Silver Leaf .....	.02	.01 $\frac{1}{4}$
Seneca-Superior .....	.02 $\frac{1}{2}$	.01 $\frac{1}{2}$
Timiskaming .....	.33	.32 $\frac{1}{2}$
Trethewey .....	.15	.13 $\frac{1}{2}$
White Reserve .....	.22	...
Wettlaufer .....	.07	.06
York, Ontario .....	...	.01 $\frac{1}{2}$

## Gold.

	Asked.	Bid.
Apex .....	.05 $\frac{3}{4}$	.05 $\frac{1}{4}$
Boston Creek .....	.03	...
Davidson .....	.39	...
Dome Extension .....	.16	.15
Dome Lake .....	.19	.18
Dome Mines .....	10.25	9.85
Dome Consolidated .....	.08	.06
Eldorado .....	.02 $\frac{1}{4}$	.01 $\frac{1}{2}$
Gold Reef .....	.01 $\frac{1}{2}$	.01 $\frac{1}{4}$
Foley .....	.55	...
Hollinger Consolidated .....	4.33	4.30
Homestake .....	.48	...
Inspiration .....	.07	.04 $\frac{1}{2}$
Keora .....	.20	.16
Kirkland Lake .....	...	.40 $\frac{1}{2}$
McIntyre .....	1.50	1.49

Moneta .....	.09	.06
Newray Mines .....	.72	.70
Pearl Lake .....	$\frac{1}{4}$	...
Porcupine Bonanza .....	.09	...
Porcupine Crown .....	.38	.37 $\frac{1}{4}$
Porcupine Gold .....	.01 $\frac{1}{2}$	...
Porcupine Imperial .....	.03	.02 $\frac{1}{2}$
Porcupine Tisdale .....	.02 $\frac{1}{2}$	.01 $\frac{3}{8}$
Porcupine Vipond .....	.32 $\frac{1}{2}$	.32
Preston .....	.04 $\frac{1}{2}$	.04
Schumacher Gold M. ....	.43	.42
Teck-Hughes .....	.55	.49
Thompson-Krist .....	.09 $\frac{1}{2}$	.08
West Dome Consolidated .....	.18	.17 $\frac{3}{4}$

## TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.
Cobalt oxide, grey, \$1.65 per lb.
Cobalt metal, \$2.25 per lb.
Nickel metal, 45 to 50 cents per lb.
White arsenic, 15 cents per lb.
Aug. 8, 1917—(Quotations from Canada Metal Co., Toronto.)
Spelter, 12 $\frac{1}{2}$ cents per lb.
Lead, 13 cents per lb.
Tin, 63 cents per lb.
Antimony, 18 cents per lb.
Copper, casting, 33 cents per lb.
Electrolytic, 35 cents per lb.
Ingot brass, yellow, 23 cents; red, 25 $\frac{1}{2}$ cents per lb.
Aug. 8, 1917—(Quotations from Elias Rogers Co., Toronto.)
Coal, anthracite, \$9.50 per ton.
Coal, bituminous, nominal, \$9.00.

## NEW YORK MARKETS.

Connellsville Coke—
Furnace, spot, \$12.50 to \$13.50.
Furnace, contract, nominal.
Foundry, spot, \$13.50 to \$14.50.
Foundry, contract, nominal.
Straits Tin, spot, f.o.b., \$63.75.
Copper—
Prime Lake, nominal, \$29.50 to \$30.00.
Electrolytic, nominal, \$28.00 to \$28.50.
Casting, nominal, \$28.00 to \$28.50.
Lead, Trust price, 11.00 cents.
Lead, outside, nominal, 10.75 to 11.00 cents.
Spelter, prompt western shipment, 8.67 $\frac{1}{2}$ to 8.80 cents.
Antimony—Chinese and Japanese, nominal, 15.50 cents.
Aluminum—nominal.
No. 1 Virgin 98-99 per cent., 48.00 to 50.00 cents.
Pure, 98-99 per cent. remelt, 46.00 to 48.00 cents.
No. 12 alloy remelt, 36.00 to 38.00 cents.
Powdered aluminum, 75.00 to 85.00 cents.
Metallic magnesium—99 per cent. plus, \$2.00 to \$2.50.
Nickel—Shot and ingot, 50.00 cents.
Electrolytic, 55.00 cents.
Cadmium, nominal, \$1.45 to \$1.50.
Palladium, \$115.00.
Quicksilver (July shipment from California), \$115.00.
Platinum—Pure, \$105.00.
10 per cent. Iridium, \$111.00.
Cobalt (metallic), \$2.70.
Tungsten—
Wolframite, \$25.00.
Scheelite, \$26.00.
Silver (official), 80 $\frac{3}{4}$ cents.

**Metal Products.**—Following quotations represent mill prices and are strictly nominal except in the case of lead sheets and sheet zinc:

**Sheet Copper—**

Hot rolled, 36.00 to 38.00 cents.

Cold rolled, 37.00 to 39.00 cents.

(Shipments from stock 2c per pound extra.)

Copper bottoms, 50.00 cents.

Copper in rods (round), 40.00 cents.

Square and rectangular, 41.00 cents.

Copper wire, nominal, Aug., 33.00 to 33.50 cents.

Copper wire, Sept., Oct., 32.00 to 33.00.

**High brass—**

Sheets, 33.25 to 35.25.

Wire and light rods, 33.25 to 35.25.

Heavy rods, 33.25 to 33.75.

Low brass—sheet, wire and rods, 38.75 cents.

**Tubing—**

Brazed bronze, 50.25 to 50.50.

Brazed brass, 46.75 to 47.75.

Seamless copper, 45.50 to 48.00.

Seamless brass, 41.00 to 45.00.

Seamless bronze, 54.00 cents.

Full lead sheets, 12.75 cents.

Cut lead sheets, 13.00 cents.

Sheet zinc, f.o.b. smelter, 19.00 cents.

### STANDARD SILVER-LEAD MINING COMPANY.

For reference purposes, the following figures have been taken from the balance sheet, for the year ended December 31, 1916, of the Standard Silver-Lead Mining Co., operating silver-lead-zinc mines and a concentrating mill near Silverton, Sloean Lake, British Columbia, and having its head office in Spokane, Washington, U.S.A., and its provincial office in Victoria:

Dr.—

Capital stock . . . . .	\$2,000,000.00
Accounts payable . . . . .	52,441.64
Net amount realized from operations . . . . .	2,642,626.32
Surplus . . . . .	170,000.00
	<hr/>
	\$4,865,067.96

Cr.—

Amount computed as representing value of ore deposits exhausted . . . . .	2,000,000.00
Plant and buildings . . . . .	132,249.20
Aylard tunnel . . . . .	43,497.73
No. 7 tunnel . . . . .	29,496.85
Alpha and Anacortes mineral claims . . . . .	71,000.00
Ore in transit . . . . .	72,870.67
Supplies in stock . . . . .	11,075.47
Distributed as dividends . . . . .	2,400,000.00
Cash on hand . . . . .	104,878.04
	<hr/>
	\$4,865,067.96

### IMPERIAL OIL TO DRILL IN ALBERTA.

Calgary, July 29. —It is reported that the Imperial Oil Company, through its agents, already has six cars of oil drilling machinery on the ground in the Viking, Alberta, gas and prospective oil field, and that drilling operations will begin at once. Five wells are to be put down. The derricks are already under construction.

Dr. T. O. Bosworth, the geologist, who has located the drilling site for the new wells, has long been associated with the Imperial Oil Company of Canada, as geological expert, and he has made his headquarters at the general offices of the Imperial Oil Company at Toronto.

### THE EFFICIENT USE OF COAL.

The U. S. Bureau of Mines, Department of the Interior, in co-operation with the Illinois State Geological Survey and the Department of Mining Engineering of the University of Illinois, has completed a study on the coking of Illinois coals, and has published the results of this investigation in Bulletin 138, by F. K. Ovitz. Mr. Ovitz, in discussing the subject, says:

"In its endeavor to promote a more efficient use of coal the Bureau of Mines, in co-operation with the Illinois State Geological Survey and the University of Illinois, has undertaken an investigation of the coking of Illinois coals. The investigation was started by collecting from various sources the data regarding experiments already made by others; these data have been compiled and are presented herein.

"The present methods of using coal seem wasteful. When coal is burned in furnaces for the generation of steam, only the heat generated by the fuel is utilized; possible by-products are not only lost, but frequently are the source of the smoke nuisance. The volatile matter containing the tar and heavy hydrocarbon gases is difficult to burn completely in many furnaces, and its decomposition produces black smoke. When coal is coked in a by-product oven, the volatile matter is no longer a nuisance but, on the contrary, is the source of many by-products, including benzol, toluol, gas, tar, ammonia, and cyanogen, all of which increase the value that may be obtained from coal.

"The coke that remains after the volatile matter has been driven off is a valuable fuel that can be used for almost all purposes for which bituminous coal can be used, and it is necessary for some metallurgical work. It has about the same heating value as anthracite coal. Because of its cleanness and its burning without smoke, it is well suited for domestic heating and the generation of steam in plants where smokelessness is demanded. The use of coke for these purposes would do much to eliminate smoke in cities. The best grades are regarded as essential in many metallurgical processes for reducing ores to their metals.

"By-product coking in the United States during the past three years has increased greatly. When the ovens now in course of construction are completed, the total capacity of by-product ovens will be more than double what it was in 1913. This increase has led to a search for coals other than those now known to be available for use in by-product ovens. Tests with coals from the southern part of Illinois have indicated that coke from Illinois coal mixed with other coals can be used for fuel purposes and that coke from mixtures of Illinois coal with low-volatile coking coal might be suitable for some metallurgical work. In the tests the yield of ammonia was larger than is obtained from eastern coal.

### ENGLAND TAKES OVER IRON ORE MINES.

Washington, Aug. 6.—A cablegram from United States Consul General at London states that Minister of Munitions has taken possession of all iron ore mines in counties of Cumberland and Lancashire.



### APPEAL IN SULPHUR SMOKE CASES.

Sudbury, Aug. 4.—In the five actions against the Canadian Copper Company, brought by Morley Arthur, Louis B. Giroux and Joseph David, all of the Township of Balfour, and by John Lindala and Matti Lindala, of the Township of Louise, for damages to their crops in 1916 by sulphur smoke from the smelter and roast-beds at Copper Cliff and from the new roast-beds at Mileage 17 on the A. E. R., the Canadian Copper Company has now appealed through its solicitor, Geo. E. Buchanan, Esq.

His Honor Judge Kehoe heard the evidence for the full week beginning June 18th. He rendered his decision on July 16th and disposed of the question of costs on July 17th. In the written judgment he awards Morley Arthur \$300 and costs, Joseph David \$175 and costs, Louis B. Giroux \$150 and costs, Matti Lindala \$140 and costs, John Lindala \$80 with costs fixed at \$15. All the others were allowed their costs in full to be taxed.

The reasons for the appeal in each of the five cases are:

(1) The said judgment was contrary to evidence and against the weight of evidence.

(2) The learned trial judge erred in holding that there was any damage to the plaintiff's crops. The mere presence of smoke on the plaintiff's farm is no indication of damage to vegetation; damage can only occur under certain special coincidences of weather conditions, when vegetation becomes bleached or marked, and it is the extent of bleaching or marking which is the only criterion of damage. The extent of the bleaching was so slight and so doubtful on the plaintiff's farm that it could have no effect on his crops.

(3) The description given by the plaintiff and his witnesses is evidence of the result of disease, weather conditions and poor cultivation, and not of sulphur smoke bleaching.

### TEMISKAMING.

In a letter to shareholders in Temiskaming Mining Co., Mr. Max Morgenstein says in part: When the apex of production is believed passed, producing mining companies have been anxious to add years of life and prosperity through the purchase of additional properties, but never before to my knowledge has any company of importance been interested in a "no voice" or minority interest. A controlling interest must be acquired or none at all. Yet the men who have been elected to act in the capacity of our directors and trustees to look after our combined interest had the audacity to ask you and me to diminish our treasury heavily in order to invest in some of the shares of another company in which they were interested while the benefits of the major portion of that company would have gone to the Beaver company.

The official records of the Temiskaming and Beaver companies answer the important question, without any doubt, where the interest of our directors lay. President Culver and his associates owned in all 126,865 shares Beaver to only 36,450 of Temiskaming. It is the natural thing for any coterie of shrewd business men to seek protection where their largest interests lay. These gentlemen represented us and were elected to safeguard our interests. Could they conscientiously act for the sellers as well? Can they make the best bargain for us which it is their duty to do while their major interest lies with the selling company?

While I quite agree with Mr. Culver that our company will have to buy other mining interests some time

if it wishes to stay in business, as all precious metal mines get exhausted some time, it should be done on entirely different lines than proposed lately.

Assuming that your curiosity to know who I am has been aroused, I am entirely willing for you to know that I am a merchant of established reputation in New York city, where I have been a resident for upward of thirty-four years, am a citizen of U. S. for over twenty-nine years. I began to become interested in mines for precious metals by small investments, so I am today the largest individual owner of shares in a number of companies in the Province of Ontario, Canada. I candidly admit that I still own Temiskaming shares at 9¼c per share on which I have collected in the meantime 21c per share in dividends and have kept buying continuously ever since with no intention of selling any, because, I bought this vast amount of much over 200,000 shares with my eyes wide open on intrinsic value only. Our company has nearly 2,900 shareholders scattered all over, materially over half of the shares are owned in the United States.

### CANADA COPPER CORPORATION.

New financing through an issue of \$2,500,000 convertible bonds has been perfected by Canada Copper Corporation. The new issue will be underwritten by Hayden, Stone & Co. and Eugene Meyer, Jr., & Co. The proceeds of the bonds will be used for the construction of a 3,000-ton mill and its complete equipment including flotation. Bonds will be convertible into stock of the company at \$3.

There has been fully developed on the property of the Canada Corporation 10,000,000 tons of ore, although indications point to a material increase in tonnage as development progresses. The property stands alone among disseminated deposits as having only sulphide ores; test runs in a 60-ton mill have shown that a 90 per cent. extraction, or 27 pounds of copper per ton of ore, may be expected.

Canadian Pacific will build a spur into the property, making it a comparatively simple matter to ship concentrates from the new mill to the company's Greenwood smelter.

Further on, along the same line is the Trail smelter and refinery, controlled by the Canadian Pacific, where the product will probably be put into marketable shape.

The Canada mine at present could ship 1,000 tons of ore daily. The mill should be finished within a year.

### LAKE SUPERIOR CORPORATION.

It is reported that negotiations between Lake Superior stockholders and bondholders' committee representing Flemming interests, looking to election of a new president who shall be an experienced steel man, have progressed considerably. Such a man has been approached and was inclined favorably, it is understood, provided directors induce bondholders to agree to certain things.

Directors on recent visit to the plant were shown contracts, which will keep the steel plant running at capacity until July, 1918, signed with Canadian Government, at prices ranging around \$70 a ton.

With recent blowing in of new 75-ton furnace the steel plant now has a daily capacity of 2,000 tons. The greater part will be shell steel, since the Canadian Government has issued orders to make steel rails only on absolute necessity for national railways.—Boston News Bureau.



**ANKERITE.**

The Coniagas Mines, Limited, of St. Catharines, are now proceeding to development of deposits located on the Ankerite property, Porempine. The Coniagas company has held this property under option since February, 1916, and during this period has conducted an extensive and successful exploration of one of the three claims comprising the group. Two strong, parallel veins were located, one for a length of over 1,400 ft. and the other for about 900 ft. These were explored by cross-cutting, sinking, drifting and diamond drilling at numerous points along their strike and it is said that satisfactory gold values were found at every point. A steam power plant for development purposes is now being installed and while development of located deposits is under way the company will proceed with exploration of other areas of the property.

In March last, there was received at the Consolidated Mining and Smelting Company's smelting works at Trail a carload of ore from the Mandy Mining Company, which is opening a mining property in the new field of Northern Manitoba, north of Le Pas. Two or three weeks later another carload of ore was received, the consignor having been another company operating in the same part of the Dominion. Concerning the latter, it is learned from the Engineering and Mining Journal that "the Northern Manitoba Mining and Development Co. recently shipped a carload of 57,000 lbs. of gold-bearing quartz to Trail, British Columbia. The returns for the car were \$2,323 in gold, an average of \$81.53 a ton. The company is purely a local concern, the organizers being well known engineers and mining men."

Later information is that during the period between June 22nd and July 7th ore receipts at Trail included 565 tons of ore from the Mandy Mining Company, a brief account of whose operations was printed in The Canadian Mining Journal of July 1st, p. 274.

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#### Recent Publications

The Nickel Industry: with special reference to the Sudbury region, Ont. Report on, by Professor A. P. Coleman, Ph.D.

The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.

Building and Ornamental Stones of Canada (Quebec). Vol. III. Report on, by W. A. Parks, Ph.D.

The Bituminous Sands of Northern Alberta. Report on, by S. C. Ellis, M.E.

Peat, Lignite and Coal: their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.

Annual Report of the Mineral Production of Canada During the Calendar Year 1914, by John McLeish, B.A.

The Petroleum and Natural Gas Resources of Canada: Vols. I. and II., by F. G. Clapp, M.A., and others.

The Salt Industry of Canada. Report on, by L. H. Cole, B.Sc.

Electro-plating with Cobalt. Report on, by H. T. Kalmus, Ph.D.

Electro-thermic Smelting of Iron Ores in Sweden. Report on, by A. Stansfield, D.Sc.

Non-metallic Minerals Used in Canadian Manufacturing Industries. Report on, by H. Frechette, M.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

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**Ceramic Laboratory.**—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.

**Structural Materials Laboratory.**—Experimental work on sands, cements and limes is also undertaken.

Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

### GEOLOGICAL SURVEY

#### Recent Publications

Memoir 64. Preliminary Report on the Clay and Shale Deposits of the Province of Quebec, by J. Keele.

Memoir 74. A List of Canadian Mineral Occurrences, by Robert A. A. Johnston.

Memoir 77. Geology and Ore Deposits of Rossland, British Columbia, by C. W. Drysdale.

Memoir 82. Rainy River District of Ontario. Surficial Geology and Soils, by W. A. Johnston.

Memoir 84. An Exploration of the Tazin and Taltson Rivers, Northwest Territory, by Charles Camsell.

Memoir 85. Road Material Surveys in 1914, by L. Reinecke.

Memoir 87. Geology of a Portion of the Flathead Coal Area, British Columbia, by J. D. Mackenzie.

Memoir 88. Geology of Graham Island, British Columbia, by J. D. Mackenzie.

Memoir 89. Wood Mountain-Willowbunch Coal Area, Saskatchewan, by Bruce Rose.

Memoir 92. Part of the District of Lake St. John, Quebec, by John A. Dresser.

Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.

Memoir 94. Ymir Mining Camp, British Columbia, by Charles Wales Drysdale.

Memoir 95. Onaping Map-Area, by W. H. Collins.

Map 59A. Wheaton, Yukon Territory.

Map 60A. Wheaton, Yukon.

Map 67A. Kirkfield Sheet, Victoria County, Ontario.

Map 150A. Ponhook Lake Sheet, Nova Scotia.

Map 175A. Ymir, Kootenay, British Columbia.

Map 176A. Graham Island, Queen Charlotte Islands, British Columbia.

Map 177A. Southern Portion of Graham Island, Queen Charlotte Islands, British Columbia.

Map 180A. Espanola Area, Sudbury District, Ontario.

Map 184A. Roberval, Lake St. John County, Quebec.

Map 187A. Southern Plains of Alberta.

Applicants for publications not listed above should mention the precise area concerning which information is desired.

Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

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The Technical Division is equipped to take care of the most difficult blasting problems. Every man is an expert, experienced in actual work.

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Northern Canada Supply Co.

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Canada Metal Co., Ltd.

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Hull Iron & Steel Foundries, Ltd.

**Beltlag—Leather, Rubber and Cotton—**  
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Northern Canada Supply Co.  
Jones & Glassco.

**Blasting Batteries and Supplies—**  
Can. Ingersoll-Rand Co., Ltd.  
Curtis & Harvey (Canada) Ltd.  
Northern Canada Supply Co.  
Canadian Explosives, Ltd.

**Blowers—**  
Can. Fairbanks-Morse Co.  
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Northern Canada Supply Co.

**Boilers—**  
Can. Fairbanks-Morse Co.  
Fraser & Chalmers of Canada, Limited.  
Northern Canada Supply Co.  
Can. Ingersoll-Rand Co., Ltd.

**Buses, Cable Junction—**  
Standard Underground Cable Co. of Canada, Ltd.

**Buckets—**  
Can. Fairbanks-Morse Co.  
Hendrick Mfg. Co.  
M. Beatty & Sons, Ltd.  
Northern Canada Supply Co.

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Standard Underground Cable Co. of Canada, Ltd.

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Sullivan Machinery Co.

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Can. Fairbanks-Morse Co.  
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Jeffrey Mfg. Co.  
Northern Canada Supply Co.  
MacKinnon, Holmes & Co.

**Cement Machinery—**  
Northern Canada Supply Co.  
Hull Iron & Steel Foundries, Ltd.

**Chains—**  
Can. Fairbanks-Morse Co.  
Jeffrey Mfg. Co.  
Jones & Glassco.  
Northern Canada Supply Co.  
B. Greening Wire Co., Ltd.

**Chemists—**  
Canadian Laboratories.  
Campbell & Deyell.  
Thos. Heys & Sons.  
Milton Hersey Co.  
Ledoux & Co.

**Coal—**  
Dominion Coal Co.  
Nova Scotia Steel & Coal Co.

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Jeffrey Mfg. Co.  
Sullivan Machinery Co.  
Can. Ingersoll-Rand Co., Ltd.

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Roberts & Schaefer Co.

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Darling Bros., Ltd.  
Escher Wyss & Co.  
W. Fraser.

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**Drills—Core—**  
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**Drills—Diamond—**  
Sullivan Machinery Co.  
Northern Canada Supply Co.

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**Drill Steel Sharpeners—**  
Can. Ingersoll-Rand Co., Ltd.  
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**Lamps—Electric—**  
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Fraser & Chalmers of Canada, Limited.  
Northern Canada Supply Co.  
Hendrick Mfg. Co.



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<b>Pig Lead—</b> Canada Metal Co., Ltd.	<b>Pumps—Electric—</b> Can. Fairbanks-Morse Co. Darling Bros., Ltd. Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd. Fraser & Chalmers of Canada, Limited.	<b>Rope—Wire—</b> B. Greening Wire Co., Ltd. Allan, Whyte & Co. Northern Canada Supply Co. Fraser & Chalmers of Canada, Limited.	<b>Steel Barrels—</b> Smart-Turner Machine Co.
<b>Pipes—</b> Can. Fairbanks-Morse Co. Canada Metal Co., Ltd. Consolidated M. & S. Co. Pacific Coast Pipe Co., Ltd. Northern Canada Supply Co. Smart-Turner Machine Co.	<b>Pumps—Pneumatic—</b> Can. Fairbanks-Morse Co. Darling Bros., Ltd. Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd. Sullivan Machinery Co.	<b>Samplers—</b> C. L. Constant Co. Ledoux & Co. Milton Hersey Co. Thos. Heys & Son.	<b>Steel Drills—</b> Sullivan Machinery Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd.
<b>Pipe Fittings—</b> Can. Fairbanks-Morse Co. Northern Canada Supply Co.	<b>Pumps—Steam—</b> Can. Fairbanks-Morse Co. Can. Ingersoll-Rand Co., Ltd. Darling Bros., Ltd. Mussens, Limited. Northern Canada Supply Co.	<b>Scales—</b> Can. Fairbanks-Morse Co.	<b>Steel Drums—</b> Smart-Turner Machine Co.
<b>Piston Rock Drills—</b> Mussens, Limited.	<b>Pumps—Turbine—</b> Can. Fairbanks-Morse Co. Darling Bros., Ltd. Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd. Fraser & Chalmers of Canada, Limited.	<b>Screeners—</b> B. Greening Wire Co., Ltd. Jeffrey Mfg. Co. Northern Canada Supply Co. Fraser & Chalmers of Canada, Limited. Roberts & Schaefer Co. Hendrick Mfg. Co.	<b>Steel Tool—</b> N. S. Steel & Coal Co. Armstrong, Whitworth of Can., Ltd.
<b>Pneumatic Tools—</b> Can. Ingersoll-Rand Co., Ltd. Jones & Glassco.	<b>Pumps—Vacuum—</b> Can. Fairbanks-Morse Co. Darling Bros., Ltd. Smart-Turner Machine Co.	<b>Screeners—Cross Patent Flagged Lip—</b> Hendrick Mfg. Co.	<b>Surveying Instruments—</b> W. F. Stanley. C. L. Berger.
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<b>Pulleys, Shafting and Hangings—</b> Can. Fairbanks-Morse Co. Fraser & Chalmers of Canada, Limited. Jeffrey Mfg. Co. Northern Canada Supply Co.	<b>Rails—</b> W. Fraser.	<b>Sheet Lead—</b> Canada Metal Co., Ltd.	<b>Tipples—</b> Roberts & Schaefer Co.
<b>Pumps—Boller Feed—</b> Can. Fairbanks-Morse Co. Darling Bros., Ltd. Smart-Turner Machine Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd. Fraser & Chalmers of Canada, Limited. Wettlaufer Bros.	<b>Roasting Plants—</b> Fraser & Chalmers of Canada, Limited.	<b>Sheets—Genuine Manganese Bronze—</b> Hendrick Mfg. Co.	<b>Transits—</b> C. L. Berger & Sons.
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# Ontario's Mining Lands

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Ontario, with its 407,262 square miles of area, contains many millions of acres in which the geological formations are favourable for the occurrence of minerals, 70 per cent. of the rocks being of pre-Cambrian age.

The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Helen, Magpie and Moose Mountain mines.

Many other varieties of useful products are found in Ontario:—cobalt, iron pyrites, arsenic, quartz, graphite, talc, feldspar, mica, corundum, molybdenite, platinum, palladium, actinolite, apatite, fluorite, salt, gypsum, petroleum and natural gas.

Building materials, such as cement, brick, marble, limestone, sandstone, trap, lime, sand and gravel, are abundant.

Ontario in 1915 produced over 44 per cent. of the total mineral production of Canada, or more than twice that from any other Province. The preliminary report of the Ontario Bureau of Mines shows the output of the mines and metallurgical works of Ontario for the year 1915 to be worth \$57,532,844, of which the metallic production was \$47,721,180. There were 79 producing mines, 62 of which operated at a profit.

The prospector can go almost anywhere in the mineral regions in his canoe; the climate is invigorating and healthy, and there is plenty of wood and good water.

A miner's license costs \$5.00 per annum and entitles the holder to stake out in any or every mining division three claims of 40 acres each.

For list of publications, illustrated reports, geological maps and mining laws, apply to

**HON. G. H. FERGUSON,**

Minister of Lands, Forests and Mines

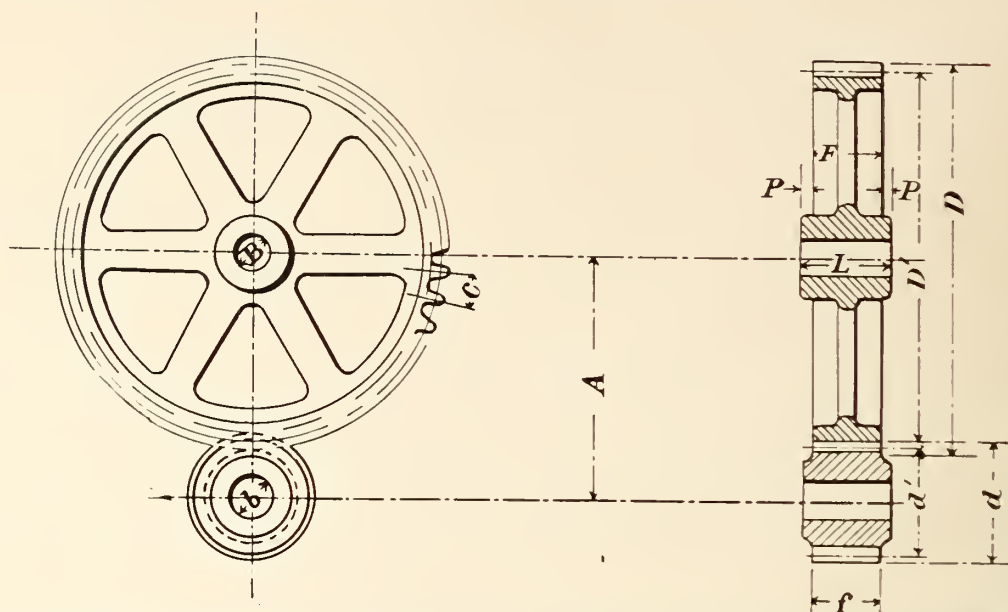
**Toronto, Canada.**



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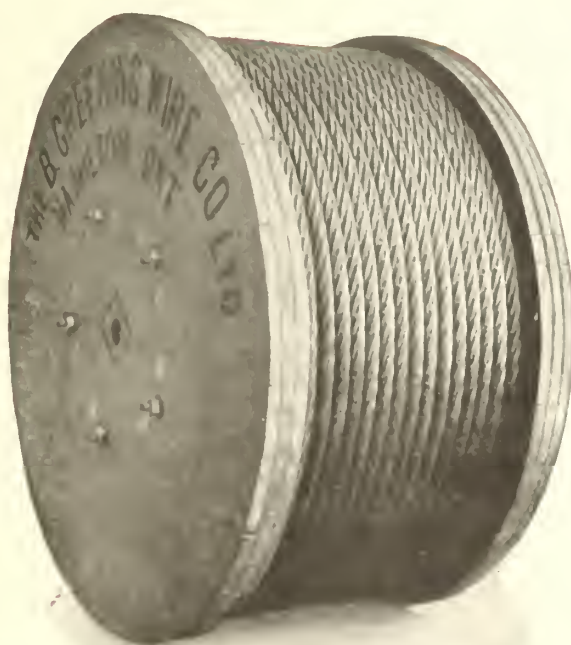
# CANADIAN MINING JOURNAL

VOL. XXXVIII

TORONTO

No. 17

## WIRE ROPES



HOISTING      HAULAGE

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5. Water tube and combined air and water set for cleaning the drill hole.
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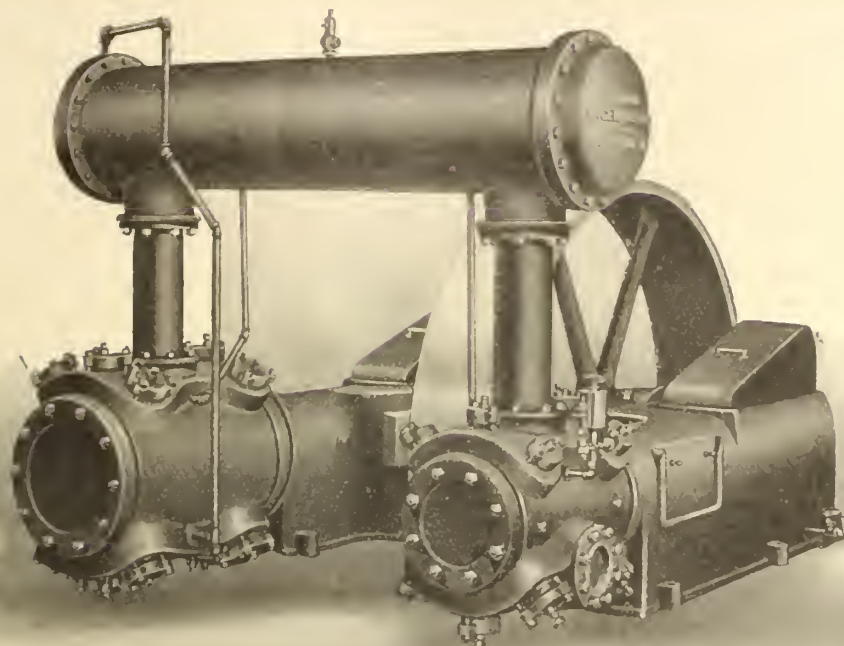
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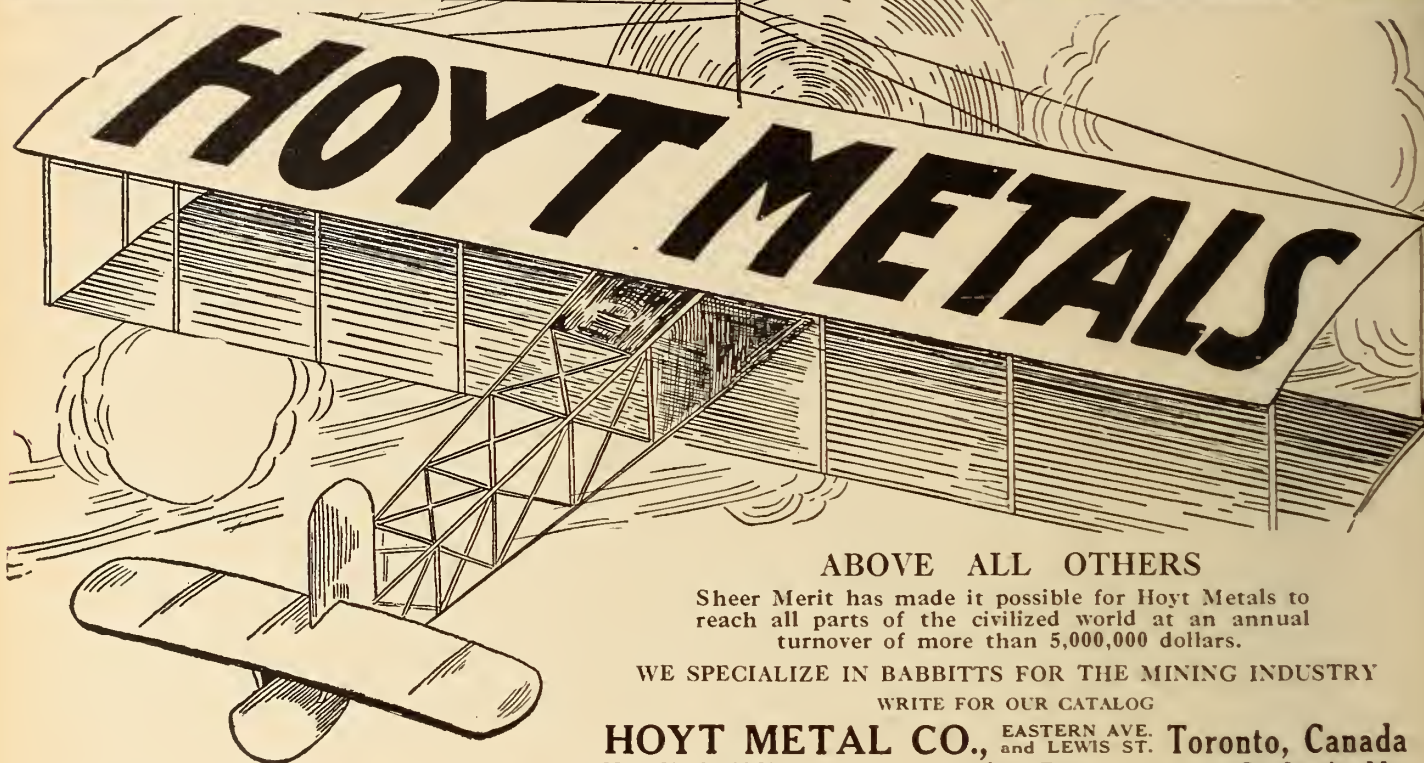
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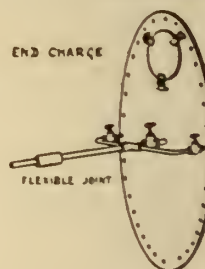
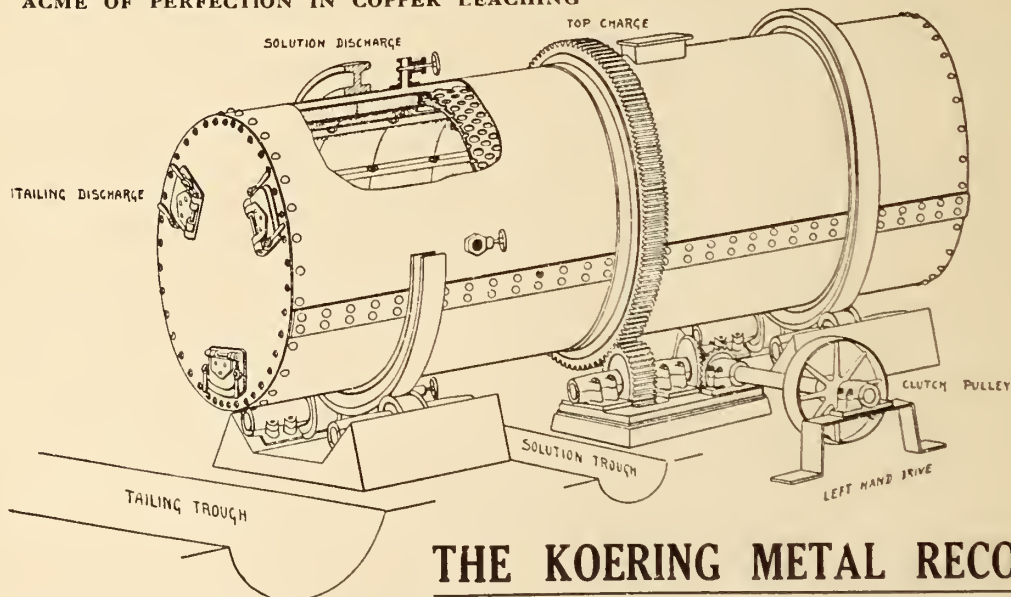
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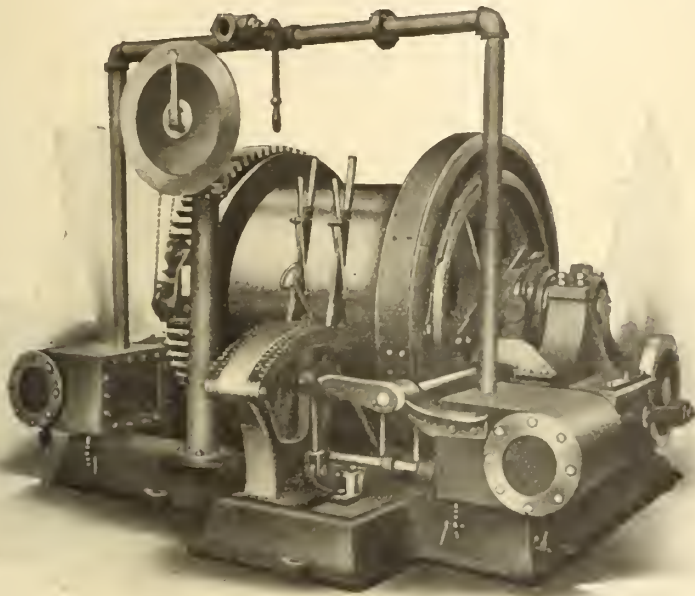
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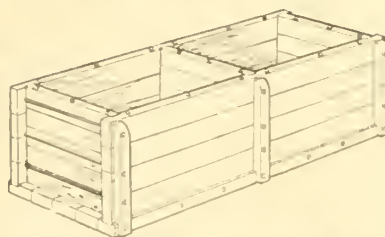
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*The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, etc.*

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**MINERS' CERTIFICATES.** First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

**WORKING CONDITIONS.** During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

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On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

### NOTICE

Notice is hereby given that we will enforce our patents and stop all infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

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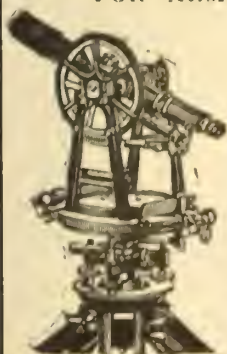
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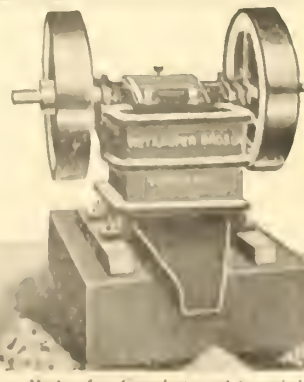


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VOL. XXXVIII.

TORONTO, September 1st, 1917.

No. 17

## The Canadian Mining Journal

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Editor

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### SUDBURY'S NEW INDUSTRY.

The power problem of the British America Nickel Corporation has been settled.

From now on, rapid progress may be expected at the property at Murray Mine, Sudbny district, Ontario. During the past several months exploration has been carried on with considerable success and additional ore located by diamond drilling. Plans made for the construction of smelter and refinery have not been carried out, pending arrangements being made for power. Satisfactory arrangements have now been made for power. The plans have been approved by Sir Adam Beck and will be acted upon as soon as the Ontario Government passes on them. This should be only a matter of a few days now.

During the past few weeks there have appeared in several papers, news items from Boston and New York concerning the British America company as a factor in the nickel market. There has been expressed some doubt as to the intentions of the company. We can assure our readers that the British America Nickel Corporation is to be a big factor in the nickel industry. It owns good orebodies and a proved process for treating the ore; it has arranged for the sale of its product; and it has employed a manager who has a reputation for getting things done. The men in charge of the corporation's affairs have during the past year encountered and overcome several difficulties and are now only awaiting approval of the Ontario Government before proceeding with construction work.

The demand for nickel is so great that the entry of a third big company into the Sudbury district has long been expected. It seems likely that there will be a ready market, during and after the war, for much larger quantities of nickel than can be produced at present. The two present producers will of course be somewhat affected by the new producer; but there is plenty of business in view for all.

The Sudbury district is to be congratulated on securing a new industry. A nickel copper smelter and refinery near Sudbury is no longer a mere dream. The plans are ready and the money is available. A company controlled by the British Government will in less than two years be shipping nickel from Sudbury to England.

### MORE RESEARCH BUNKUM.

There has just reached this country from London a report on the resources and production of iron ores and other principal metalliferous ores used in the iron and steel industry of the United Kingdom. The report was prepared at the instance of the Advisory Council, Department of Scientific and Industrial Research, "to assist their Standing Committee on Metal-



lurgy in their survey of the field for research in connection with iron and steel."

Those who prepared this report may have believed that they were compiling useful information. If we are to judge from what they say of Canadian ore deposits, however, it would seem necessary to request the Advisory Council to gather a little real information on Canadian resources before publishing more reports on them. The present report, so far as references to Canada are concerned, does not reflect credit on its authors or on the organization responsible for its publication.

The report is neither accurate nor up-to-date. Although just published, it contains such absurdities as the following: "New furnaces have lately been installed at Deseronto, Hamilton, Midland, Sault Ste. Marie and at Port Colborne"; "mining operations are at present being carried on at Moose Mountain and at the Atikokan Range, west of Port Arthur." From such statements it is evident that the authors have depended on reports now out of date. There is no excuse for this, as many more recent reports are available. As our readers are aware, Moose Mountain and Atikokan Range mines are idle. The chief producer is the Magpie. The Ontario furnaces mentioned have been in operation for several years. Most of the iron ore used is imported.

One of the chief constituents of much of the steel used in armament is nickel. As most of the nickel used in the world is produced in Ontario we might expect to find in the Advisory Council's report a fairly intelligent account of Canadian nickel deposits. In view of the fact that much has been recently published concerning these deposits we might be pardoned for expecting the review to be up-to-date as well as accurate. Even an Advisory Council may be expected to make some attempt to gather reliable information. There is, however, no indication of this in the report on Canadian nickel. Here is the Advisory Council's grotesque account of the occurrence of nickel in Canada:

"Canada.—The most important deposits of nickel, at present known to exist, are those of Cobalt and Sudbury, both in Ontario, Canada. A recent find of nickel ore has also been made at the Alexo mine, in North Ontario.

"J. D. Frossard has described the nickel ores of Sudbury (Philip and Son, London, 1893). E. D. Peters has also published an important paper on the Sudbury nickel and copper deposits in the Transactions of the American Institute of Mining Engineers, 1889. The deposits were first opened up in 1884 during the construction of the Canadian Pacific Railway, when, in making a cutting near Sudbury, the deposit now known as the Murray mine was discovered. The following are analyses of some of the nickel-cobalt-copper-ores of Sudbury:—

	Canadian Copper Co. (1889) Per Cent.	"Bessemerised" 1892 Per Cent.
Nickel . . . . .	14.84	35.93
Cobalt . . . . .	0.27	35.93
Iron . . . . .	31	1.09
Copper . . . . .	27.06	40.98
Sulphur . . . . .	26.9	19.71
C, SiO <sub>2</sub> and other im- purities . . . . .	0.92	2.29

As everyone interested in nickel should know, the world's chief source of supply is the Sudbury district, Ontario. Some nickel ore is produced at Cobalt, but the quantity is very small in comparison with the Sudbury output. The statement of the Advisory Council that "the most important deposits of nickel are those of Cobalt and Sudbury" is therefore misleading. Similar lack of appreciation of the facts is indicated in a statement that the chief ores of nickel are: niccolite, pyrrhotite, pentlandite, and garnierite.

The analyses of Sudbury ores given by the Advisory Council are ridiculous. Apparently the compilers have copied some analyses of low grade mattes and called them average analyses of ores. For inaccuracy they can only be paralleled by the "average analysis" of New Caledonia ores which we find on the same page as the Sudbury absurdities. Here are the misleading figures given for "average analysis, omitting moisture and other minor constituents":

	Per Cent.
NiO . . . . .	19.73
SiO <sub>2</sub> . . . . .	44.75
MgO . . . . .	15.25

The ore mined in New Caledonia contains only about 5 per cent. nickel and over 20 per cent. moisture.

It is to be hoped that the Advisory Council is better informed concerning resources of the United Kingdom than concerning Canadian resources. An indication of its information concerning the Lake Superior regions is the following amusing sentence: "In the area between the Marquette and Menominee regions (both in Michigan) there are two outliers, namely, the Cuyuna in Minnesota and the Braboo district in southern central Wisconsin."

The Advisory Council in Great Britain is evidently not well informed concerning mineral resources of Canada. If they insist on publishing such nonsense as that contained in this report we cannot be expected to consider their work of any value. In fact, their statements concerning Canadian mineral resources are harmful instead of useful.

## THROUGH THE MINERAL BELT OF NORTHERN MANITOBA.

Early in July, 1917, Mr. F. H. Kitto, D.L.S., representing the Natural Resources Intelligence Branch of the Department of the Interior, and Mr. J. A. Campbell, Commissioner of Northern Manitoba, made a trip together through the mineral belt of Northern Manitoba, lying north of The Pas. They went in by way of the Saskatchewan River and came out by Hudson Bay Railway, thus "swinging around the circle." They speak in glowing language of the scenic beauties of many parts of the district through which they passed and were enthusiastic about prospects of the district especially from a mineral standpoint and intimate there are good possibilities for agricultural development at different points. The following is a resume of the journey given by them, setting out some of the characteristics of the country and developments now taking place therein.

### First Stage of the Trip from The Pas.

We left The Pas on June 26th on the "Minasin," one of the Ross Navigation Company's steamers, to which was attached a large barge for carrying ore and other freight. The first stage of the journey was up the Saskatchewan river and into Cumberland lake, through the tearing river, thence after a brief stop at the old Hudson's Bay post at Cumberland House, the course was through Sturgeon lake to the Landing at the mouth of Sturgeon river, which point was reached about 7 p.m. of the 27th.

There was manifested at that point considerable activity in connection with the loading of ore, construction of the Athapapuskow road and the departure of the various passengers on the boat to different northern points, for it is from this point that miners, prospectors, traders and other parties having business in the north country branch off in various directions to their different destinations.

### The Road to Lake Athapapuskow.

It is from here that the road is being constructed to connect with Lake Athapapuskow. This road runs along the Sturgeon and Goose rivers for about five miles, then crosses Goose river and takes a pretty direct course for the lake, the total distance being about sixteen miles. We walked over the first part of this road—between seven and eight miles—and then took to the canoes which had proceeded up the river under the guidance of a couple of Indian canoe men. The road traversed is the one over which the ore from the Mandy mine was hauled last winter. It is very good in some places, but requires considerable grubbing and some ditching before it will be satisfactory as a summer road. This work, it is hoped, will be done this summer. On that portion of the road further on Messrs. Burman & Boyd, contractors, have a gang of men at work, their contract being to build and complete the road from the point where we left it to Lake Athapapuskow. Considering labor conditions, good progress is being made. When this road is completed there will be direct communication between the two lakes above mentioned—a very important link in the trans-shipment of freight.

The land along the Sturgeon and Grace rivers is of good quality and suitable for agricultural purposes. Several settlers already have gardens which are doing well. Surveyors are at work in this district and four or five townships will be opened up for settlement at an early date.

Goose Lake was negotiated in the afternoon and Goose Creek the following morning when the great Lake Athapapuskow—the lake of many rocky islands—was reached. From a scenic standpoint this lake is not surpassed on the continent. Besides, from a utilitarian standpoint evidences are abundant that minerals abound on its shores and islands. Already a number of claims have been staked out, but no development work to any extent has yet been done.

A particularly beautiful stream, Schist Creek, is the connecting link with Schist Lake. A seven-mile paddle on the inside of the three arms of this lake brought us to the Mandy camp, noted for its mining and shipment of 3,600 tons of sulphide ore last winter.

### The Mandy Mine.

The makeshift and somewhat primitive machinery which was used in this work has been discarded and new modern machinery installed in a large frame power house which is now almost completed. We descended the shaft in approved fashion—on the bucket. This is now to a depth of 90 ft. When it reaches the 100-ft. level it is proposed to start drifting. Work on the power house is being rapidly pushed to completion.

### The Great Sulphide Mine.

From the Mandy mine a walk over a so-called trail, "estimated" at four miles, landed us at Flin-Flon camp. This is the most extensive sulphide body of ore yet discovered in the north. Two diamond drills were working on this property steadily last summer, and they are still on the job, approximately 6,000 ft. of drilling having been done already this year. Over 6,000,000 tons of sulphide ore has been proven up, and there is every indication that this will develop into the greatest orebody of its kind in America. General opinion seems to be that a railway will be built in from The Pas in due course, and a smelter erected on the property.

These enterprises will result in the opening up and working of a number of other claims in the district where mineral deposits have been shown to exist, and which, owing to their remoteness and the amount of money involved in handling them under existing conditions, make their development by present owners now out of the question. The shore of the picturesque little lake is already dotted with cabins of those engaged in the development operations, and of others who own or are interested in claims in the vicinity.

We arrived back at the Mandy camp that night, and next morning started south. It was a pleasant experience, as well as an agreeable change, to make the return journey down the lake on the new stern-wheeler. A channel has been cleared in Schist Creek by removing the boulders therefrom, and the steamer and barge can now navigate this to Lake Athapapuskow, where the barge is transferred to the tug "Notin" for transportation across the lake to the northern end of the Sturgeon Lake road. This channel, however, will not be navigable in low water, so the company have cut out a road a mile or so in length connecting the two lakes. Over this road a caterpillar tractor will do the ore hauling.

It is therefore a very much handled ore that reaches The Pas for transportation—mine boat tractor tug, team hauling, Ross Navigation Company's steamer, another team haul, then finally the railway. But that kind of ore will stand all this labor and expense and still bring astonishing returns.

The return trip through Lake Athapapuskow was made in the day time, and revealed additional attractive features. By noon of the next day we had arrived



at Cranberry portage, one and a half miles in length, connecting up with Cranberry Lake. It is a good dry trail through bush, with gradual rise and descent.

#### **General Character of the Cranberry Lake Country.**

The shores and islands of the lakes and rivers throughout the journey are all well wooded, but it is only at certain of the portages that an opportunity was given for getting an idea of the character of the country generally, especially in the matter of soil and timber. The region in the vicinity of Cranberry portage is characteristic of many parts observed. It is thickly wooded with spruce, birch, jackpine and poplar, chiefly spruce, the trees being generally from 8 to 20 inches in diameter. On an island in Reed Lake, which we visited later, the trees were much larger, one of them taking over 10 ft. of tape line to go around the butt. There are stretches of good merchantable timber at different points through the area traversed, besides vast areas covered with trees suitable for pulpwood. This timber is especially valuable for mining work. The Mandy company promptly availed itself of this opportunity by erecting and operating a saw mill, and the company operating the Rex mine at Herb Lake expects to have a similar mill set up in a very short time.

Cranberry Lakes consist of several small lakes joined by narrow channels. The general formation of their shores and islands resembles that of Athapapuskow, but these lakes, while quite picturesque, suffer somewhat in comparison with their more magnificent neighbor.

#### **Claims at Copper Lake.**

It is several years since the discovery of sulphide ore was first made in this vicinity. To the north a short distance are certain small lakes, on one of which, known as Copper Lake, a number of claims are staked. Owing to discoveries having subsequently been made at more accessible points, attention has been mainly directed to those latter places. However, prospectors who have just come out of the district exhibited samples of sulphide ore which contain a variety of minerals, including silver. They state they have discovered an immense body of this ore, and careful assays are now being made. A gentleman representing Duluth capitalists, who has been looking around the district, has taken an option on some of these claims, and it is probable some development work will be done shortly.

#### **From Cranberry to Elbow Lake.**

Between Cranberry and Elbow Lakes there is a stretch of country that is different from any that had been visited. It is in the nature of low-lying level valley, varying in width from three-quarters of a mile to about one and a half miles, and on either side is a high rock wall. The river meanders through this valley in a most tortuous manner, sometimes running along the rock on either side. At times the banks are grassy meadows; again trees bend over and dip their branches into the stream, and at almost every turn there is a pond of water-lilies now in bloom. The whole course is of the kind the tired city dweller would picture in his mind for a restful summer canoe trip. From a practical standpoint, it might be pointed out that this piece of country, being composed of alluvial soil, is very fertile, and might easily be made quite productive in the way of raising root crops and cattle.

#### **Elbow Lake.**

Elbow Lake is well named. After pursuing a course

almost north the route is now straight south, so that, after canoeing 12 miles or so, one is back within a short distance from starting point. In the Elbow river are numerous rapids and falls, making several portages necessary. The banks are of rock formation, well wooded. In many places the course has to be steered between boulders. Along the water's edge on each side is a fringe of long, bright green joint grass, with black tops. Altogether this river opens up a series of natural pictures worthy of special remark. Throughout the course are to be seen the location stakes of the prospector, but only the edge of this district has been touched in this respect.

#### **Reed Lake.**

Reed Lake was traversed in the afternoon. It is one of the larger lakes of the series, and the scenery to some extent resembles Athapapuskow, but is not so diversified. It was an afternoon like what one reads about in glowing descriptions of sunny Italy, with blue skies, placid lakes, and dark green foliage. All the notable features of such a description were there that afternoon in one of Northern Manitoba's lakes.

There are several settlers at different points on the lake, mainly engaged in the fishing industry, and raising vegetables as a side-line.

From Reed Lake to Wekusko, or Herb Lake, the main feature is Sandy Lake, so called presumably from the fact that there is a small piece of hard sand beach at the end of the portage. Otherwise the shore formation is similar to that of the other lakes, only more regular. The discovery of sulphide ore on the south shore of this lake was made some time ago. On the north shore for a distance of about a mile there is an immense area of red granite.

#### **Water Power at Herb Lake.**

The waters of this lake are discharged into Herb Lake by a short river, at the mouth of which are the Wekusko falls, a series of falls and rapids in which there is a descent of 45 feet, and which, therefore, offer excellent facilities for development of power.

The journey across Herb Lake, a distance of about seven miles, was made in the evening, and we arrived at the camp of the Northern Manitoba Mining and Development Company shortly after nine o'clock, just at sunset.

#### **Moosehorn and Rex Mines.**

The changes which have been wrought in the eastern shore of Herb Lake during the last year are very noticeable. On a number of properties active development work is taking place. The Moosehorn and Rex claims are now in the category of real mines.

On the Moosehorn, otherwise known as Northern Manitoba Company's property, a complete mining plant has been erected. The shaft is sunk to a depth of 80 ft. and the vein has widened out from 15 in. on the surface to 30 in., and the ore values have increased with depth.

One shaft on the Rex is down 117½ ft., and drifting is being commenced at the 110 ft. level. The mean width of the vein is 49 in., and the assays throughout have averaged \$36. Mr. Neal, the chief engineer for Makeover Brothers, when on a visit to the mine in May, found conditions so satisfactory that he immediately ordered a complete new outfit of mining and milling machinery. Most of this is now at The Pas, and Mr. Neal is back to superintend its transportation to the mine and the installation there. The main items in this shipment are as follows: 10-ft. Lane mill,



with a capacity of 40 tons per day; amalgamating plates; 2 Deister Overstrom concentrating tables. The engine is 55 h.p., and there are two 60 h.p. return tubular boilers, and 390 cu. ft. air compressor with modern equipment of air drills. In addition, an assay office will be established and further buildings erected to accommodate a crew of 40 or 50 men. There is also being brought in, as a necessary adjunct, a portable saw mill and equipment and two gasoline launches.

#### Kiski-Wekusko Property.

The Kiski-Wekusko claims have been thoroughly prospected by stripping, and at least 20 veins uncovered. A shaft has been sunk to a depth of 53 ft. On the completion of a wagon road to the railway, machinery, which has already been purchased, will be brought in for this property.

#### Elizabeth and Bingo Claims.

Work is progressing on the Elizabeth and Bingo claims. The former is one of the best looking veins on the lake, and, while the vein in the latter is narrow, this is compensated for by its extraordinary richness.

#### Other Claims.

The owners of other claims in the district, such as the Ballard, Le Roi, etc., are getting satisfactory results for the work performed. The McCafferty claims, some distance further north, have been attracting considerable attention, and a representative of certain Ontario people has been on the ground for some time and is negotiating a deal which has every appearance of being closed out.

#### A Recent Discovery.

A recent discovery which is attracting particular attention is that of the Syndicate claim, on the other side of the lake, right across from the Rex mine. A number of prospectors and miners have visited this property, and, while no work of any moment has been done thereon, they are practically unanimous in reporting that surface indications show a particularly rich vein, 3 ft. or thereabouts in width, and well defined.

#### Transportation Facilities.

The mining district is about ten miles from McKay's Landing at the foot of the lake, where there is a fine sandy beach backed by a grove of big trees. This is the lake terminus of the Gordon road from Mile 82 H. B. Ry., a distance of about 11 miles. The road has been under construction for some months, and is now nearing completion. The laying of about 1,500 ft. of corduroy and some drainage are the main items yet to be attended to. The completion of the road will be a great boon to the mining district, and large quantities of machinery and supplies are now awaiting this event.

The country through which the road passes has various characteristics. About two and a half miles is flat limestone, almost like a pavement. There will be nearly two miles of corduroying through muskeg. The remainder is clay and moss land.

Altogether there is a considerable quantity of land in the vicinity of Herb Lake which can be brought under cultivation, with excellent results. There are now a number of small gardens and patches of potatoes. At one of the mining camps we had the pleasure of eating fresh lettuce and radishes grown on Campbell's island, a short distance from the shore. The growth of these has been exceedingly rapid, and the quality was the very best. Mr. Campbell has a con-

siderable clearing and a diversified crop of garden stuff all doing well. Mr. G. Lacroix, of Mile 82, H. B. Ry., has an acre of potatoes, and from present appearances he is entitled to expect a record crop.

After walking over the new road we were fortunate in catching an extra train on the railway and arrived back at The Pas on the evening of July 10th, having made the round trip in exactly two weeks.

### CORRESPONDENCE.

August 27th, 1917.

The Editor, Canadian Mining Journal:

Sir,—In his letter in your issue of August 15th, Dr. Adams says: "Professor Haultain's story would have been a good one if his facts were correct. . . . but . . . I may set forth the actual facts." A careful re-reading of the Doctor's letter and of my letter in the issue of July 1st fails to give me any light as to where I was incorrect. I am not wittingly lying and if I am shown where my statements are incorrect I shall be anxious to retract and to make such amends as the circumstances call for. I wish Dr. Adams would be specific in this matter either in a letter to the Editor or in one sent directly to me. Yours, etc.,

H. E. T. HAULTAIN.

### PORCUPINE CROWN.

Montreal, Aug. 18.—Directors of the Porcupine Crown Mines, Limited, have decided to pass the dividend payment on the stock, which has heretofore been paid at the rate of 12 per cent. per annum. In making the announcement the president, Sir John W. Carson, states that owing to the excessive shortage of labor in the Porcupine district and the resultant inability to keep the mine development ahead of production, the directors deemed it advisable temporarily to discontinue dividends. It is the intention to keep up the development work at the mine with whatever labor is available and to produce just enough to pay expenses. The president also states that as soon as the labor situation adjusts itself dividends will be resumed.

Porcupine Crown was placed on the 12 per cent. per annum dividend basis on January 28, 1914, when President Carson pointed out that the company was in a splendid position to pay the disbursement in view of the fact that the property had been purchased only after a considerable option period had enabled them to put it on a producing basis, fully equipped, without a cent of debt, and with ample money in the treasury for all purposes. It closed its year in 1914, or rather its initial six and one-half months with a credit on the right side of the ledger of over \$150,000, and the gross production of the mine to the end of June last was \$2,401,335, while dividends to the extent of \$840,000 have been paid.

The statement for the half year ending June 30 last shows the surplus on hand as \$277,390. The profit and loss for six months follows:

Production bullion, gross value	\$245,031.45
Mint charges, mining, milling, mine expense . . .	120,851.79
Profit on operating	\$124,179.66



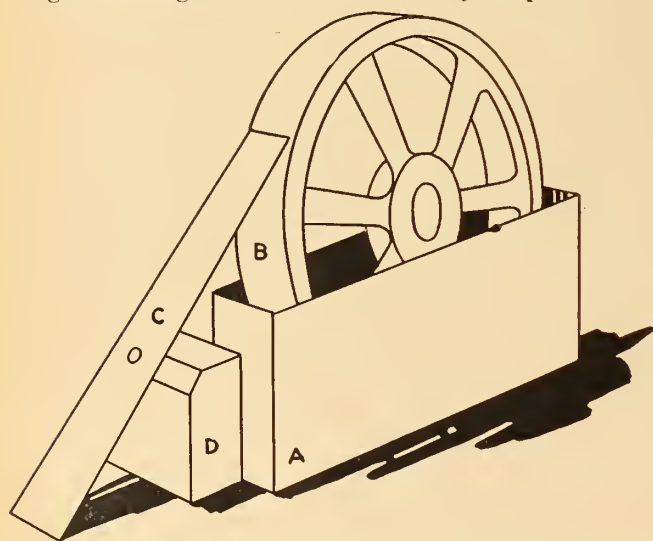
**FLOTATION OIL FEED.**

By A. E. Hall.

Any device used to feed oil in flotation operations should incorporate two main features. First, the device should be so constructed that the oil feed can be varied over a considerable range; second, once the oil feed is determined and the device set, the oil feed must be steady and regular.

The old Massey mine near Massey, Ont., which was closed down for several years, used the old Elmore flotation process. Recently the mine was reopened and the Callow flotation system installed.

The first device used as an oil feed was simply an old oil barrel with a tap in the side near the bottom. The oil mixture was made up and put into the barrel. There was a steam coil in the barrel and it was sometimes necessary, especially in cold weather, to run steam through this coil in order to keep the oil mixture liquid enough to flow through the tap easily. It was also found necessary to stir up the oil mixture frequently as the oils stratified. It was very hard to regulate the oil feed satisfactorily with the tap, although it might be imagined this would be very simple.



The arrangement shown in the sketch was then suggested and worked very satisfactorily. An iron pulley 14 inches in diameter and 3 inches face was mounted on a small shaft and placed just before the tube mill. The shaft was mounted in bearing and held a small drive pulley. A counter shaft was installed between the oil pulley shaft and the main drive shaft of the mill and using suitable pulleys a slow speed was secured at the oil-feed pulley (about 5 r. p. m.). The pulley is marked "B" in the sketch. At first a wash basin was used to hold the oil mixture. This was unsatisfactory for two reasons: (1) Enough oil mixture could not be made up at once; (2) the wheel did not go deep enough into the mixture to give the spokes opportunity to keep the mixture stirred up. Therefore a zinc box (A) should be used. When the oil mixture is put into this box and the pulley started the oil will adhere to the face of the pulley. A strip of zinc (C) is set bearing against the face of the pulley and is held in place by a nail driven into a block of wood (D). The strip of zinc (C) can be moved so as to scrape as much of pulley face as desired and therefore take off as much oil mixture as desired. The zinc strip revolves around the nail as a pivot which makes adjustment possible, but the nail is driven in tight and the zinc strip moves very hard so that it will remain where set and maintain a constant and even feed.

**CONCENTRATING COPPER ORE BY FLOTATION, AT AN ONTARIO MINE.**

By A. G. Morrison, B.Sc.

Among the rapidly increasing number of Canadian mines which are introducing flotation in their milling processes, there are only two, according to the writer's knowledge, that operate on copper ores exclusively. One of these is situated in British Columbia (the Britannia mine), and the other in Ontario.

It is the purpose of this article to describe the Ontario property.

The external factors are good with two exceptions. There is direct rail connection, plentiful water supply, a sufficiency of wood and coal and reasonably efficient labor. The unfavorable factors are the long haul of concentrates to the eastern United States smelters. There are no smelters for smelting straight copper ores in eastern Canada, and the cold winter climate is not of such consequence as the length of haul.

The surface plant is very complete and consists of a 70 ft. x 80 ft. 100-ton mill, power plants, rock-house, blacksmith shop, machine shop, assay office, manager's house, bungalow, four cottages, sleep camp, cook camp and stables.

The property consists of 800 acres along the strike of the main vein. This has a known length of 4 600 feet, with considerable minor faulting. The country rock is mainly greenstone schist and quartzite schist.

The primary ore is chalcopyrite. It is accompanied by pyrite, magnetite, specularite, quartz, and a large amount of country rock. All have been metamorphosed to some degree.

The main shaft has been sunk to a depth of 530 ft. with about 1,200 ft. of drifting. A second shaft is under development and is down about 80 ft. On another part of the property there is a tunnel 120 ft. long which develops considerable ore. The ore blocked out amounts to about 60,000 tons, or a two years' supply for the 100-ton mill. The operators avoided the common error of building a big mill when there was only a small supply of ore, as the mill itself is one of the most interesting features of the property. It is regarded as the greatest single factor affecting the success or failure of the enterprise.

The ore is trammed from the rock-house to the mill. It is fed to a 16-in. Blake type Dodge crusher which reduces it to 3-inch cubes. It is then carried by a belt conveyor to a 9-ft. Krupp mill. This mill would hardly be recognized by its makers in its present form, for the housing and screens have been removed and the ore allowed to leave the mill through 5/8-in. holes. From the Krupp mill the ore is carried by a bucket elevator to a 125-ton ore-bin. The ore-bin delivers, by means of a shaking trough, to a 6-ft. Hardinge ball mill. As these mills are not intended to be run dry, the water is added at this point by means of a 1 1/2-in. pipe controlled by an ordinary Globe valve. From here the pulp is fed by gravity to a 6 x 8 ft. Krupp pebble mill, in closed circuit, with a drag classifier, then elevated by Fernier pumps to Callow Cells. The cells are at present arranged in tandem, that is, one rougher feeding to another and the cleaner tails returned to the circuit. Mr. J. M. Callow, in his articles on the use of the cells, does not indicate a preference for either a tandem or a parallel circuit in the roughers. In fact, his summation of the situation is that it is a matter of individual taste. However, when they are run at less than capacity a curious result is shown with the tan-



dem arrangement as indicated by the following assay results:

Rougher.	Insoluble.	Copper.
First rougher concentrates ..	23.1%	22.51%
Second rougher concentrates	64.6%	4.84%
Cleaner concentrates .....	27.0%	20.50%

This result of 22.51 per cent. copper in the first rougher, 4.84 per cent. in the second, and 20.50 per cent. in the cleaner actually gives a lower grade concentrate than if only one cell were used. This, although it gives probably a better tailing result, is undoubtedly a detriment owing to freight rates. Running the first rougher at a lower grade would help the second to some extent; but would not crowd out a great deal of the 64.6 per cent. insoluble in the second rougher. The insoluble is probably largely iron, although no assays were made to determine this. Silica is also carried over in the concentrates; but not in sufficient quantities to make it a factor worthy of consideration as yet. This is an advantage over many mines where the silica is a serious factor.

This example is given as a case where a parallel arrangement of cells is a distinct advantage over a series arrangement. Had the freight rate been less of a factor, the tandem arrangement might pay, owing to the cleaner tails which this arrangement might give. Practically, however, it is not likely that the tails would be any cleaner.

To return to the flow sheet—the tailings from the roughers go to waste, the tails from the cleaner back into the circuit, and the concentrates to what are known as “hydros.” These are simply large steel bowls which spin around at a rapid rate. They are fitted inside with copper screens. The screens allow the water to go off and hold the concentrates with about 25 per cent. moisture. This amount leaves them in the form of a dry caked mud which can be dried in the sunlight in the summer and by steam coils in the winter. When it is desired to empty the “hydro” the moveable bottom is lifted and the contents allowed to run down to the next floor, where it can be easily shovelled. These concentrates make a very spectacular showing, being a bright yellow color, reminding one very strongly of a new copper coin fresh from the mint.

The oil feed, here as elsewhere, has been a matter of long experiment. Most of the experimental work has been done with Pensacola and General Naval Stores oils and include coal tar creosote, mineral creosote, wood creosote, coal oil, rosin oil, and a number of mixtures that are known only by manufacturers' numbers. These have been used with and without pine oil. The final oil settled on is 60 per cent. coal tar and 40 per cent. mineral creosote. Curiously enough this corresponds with the oil used at the Britannia mine last year on somewhat similar ore, according to the writer's recollection. Oil feeders are small things which sometimes give trouble. The form adopted at this mill consists of a pulley wheel driven at about 6 feet a minute running in a pan of oil with a square trough of tin pressing against the circumference of the wheel. The position of the trough with reference to the wheel is controlled by a threaded screw which can be set in any position by set screws. This simple and efficient scheme was in the beginning nearly abandoned owing to the fact that the heavy coal tar settled to the bottom of the pan and the light mineral creosote being on top was carried off by the wheel. However, the reason being quickly discovered, the wheel was set deeper in the oil and kept it thoroughly

stirred up. Since then it has worked without any attention being paid to it whatever. In winter the oil is kept warm by means of a steam jet, in summer this is not necessary.

One problem which the management has still to solve is saving the gold which accompanies the copper. That the flotation plant does not at present save much of the gold is clearly shown by the following assays:

23 tons hand-picked ore...0.0625 gold oz. per ton.

11 tons milled ore.....0.0450 gold oz. per ton.

This hand-picked ore gives a value in gold of \$1.29, and the milled ore gives only \$0.93 in gold, despite the fact that picking saves only 50 per cent.

This is a new problem forced on the management by the opening of new ore reserves. However, with the striking success of so many companies in floating all kinds of ore, it would be idle to be anything but optimistic as to the success of floating the gold along with the copper.

There is no pretense that the flow sheet is ideal in regard to the grinding machinery as it is still in the transition stage. The grinding machinery is greater in capacity than the flotation department. This postpones the necessity of classifying the feed. This must ultimately be solved, however, as the present arrangement makes too much fines, and as 80 mesh is regarded as the limit of grinding for flotation, this will give a greater capacity and a much more even feed.

#### Flow Sheet of Mill.

16-inch Dodge Crusher (Blake Type).	
Belt Conveyor.	
9-foot Krupp Ball Mill.	
Belt Elevator.	
125-ton Crushed Ore Bin.	
Trough Feeder.	
Water. 6-foot by 16-inch Hardinge Mill.	
3 feet by 8 feet Krupp Pebble Mill in Closed Circuit with Belt Drag Classifier.	
Frenier Pumps for Elevating Pulp.	
Callow Rougher Cell.	
Concentrates .....	Tails.
	Callow Rougher Cell.
Concentrates .....	Tails to waste.
	Callow Cleaner Cell.
.....	Tails to circuit
	Hydros for Partial Drying.
	Final Drying and Shipping.

It is hardly likely that any radical changes will be made in the flotation department, so satisfactorily does it work. The saving made varies from 90 to 95 per cent. This is the more astonishing when it is remembered that there are no other machines used in the concentrating. Wilfley tables, slime tables, and vanners being entirely eliminated. Nor can the rule of milling be invoked which calls for the greatest degree of concentration consistent with the greatest commercial return. The first cost of the cells is low, being about \$200, and the power consumption small.

The cells resemble the little girl who, when she was good, was very, very good; but when she was bad, was awful. However, it is only fair to say that it is not often that they get out of control. This occurs when there is a sudden change in the ore, oil or water feed. When this happens, the best thing to do, according to one millman, is “to curse them liberally and go away and let them recover themselves.” There is some common sense in this philosophy, for if one attempts to screw the tailings plug in too tightly the pulp fouls the blanket, and a heavy addition of water at the feed end causes the water to boil in a way that



destroys the froth. Any changes that are made should be made gradually as the machine is constitutionally opposed to sudden changes. Happily, for the good of the millman's soul, these scenes are of seldom occurrence, and as the mill force gets better acquainted with the work may be eliminated, provided that the feed is automatic and regular.

## MINING ACTIVITY IN NORTHERN BRITISH COLUMBIA.

By J. H. C. Gainfort.

From all parts of the Omineca district, the great mining area of northern British Columbia, there comes news of development and progress that is creating a new record for the province. Old mines are being improved and their output increased; new ones are being opened up and a huge stream of ore is flowing from the north to be turned into the metals that are helping to win the war for the Empire.

### Rocher Deboile.

In the Rocher Deboile mine near Hazelton a fine shoot of ore has recently been opened up in the lower vein. The showing of ore is between five and six feet wide and is said to run ten per cent. of copper.

The surface equipment of the mine is being arranged to lift this ore by the existing tramway to the level of the upper terminal of the aerial tram. This delivers it to the Grand Trunk Pacific Railway and shipments are now being resumed.

Development of the new ore is continuing satisfactorily and considerable tonnage is already in sight. The cross-cut tunnel was driven to intersect the three veins on the property at depth and is approximately 3,000 feet from the point where it is expected the main, or upper, vein, should be encountered.

Drifting is being carried on here on vein matter and there is every expectation that the main vein will be proved at this depth.

Work on the wagon road from Skeena Crossing on the Grand Trunk Pacific Railway is being carried on by the Government road crew. Some much needed improvements are being effected and the road is being put in good condition.

### Delta Copper.

The Delta Copper Company controls the Delta and Chicago groups, as well as several other locations, making in all twenty-five claims, and adjoins the Rocher Deboile on the east.

Active work was carried on during last winter on the Highland Boy and the Delta groups under the supervision of Mr. G. A. Clouthier, the newly appointed Government engineer in charge of No. 1 district. At present the necessary communication with the railway is being completed and work is being concentrated on that while the weather permits.

In addition to the known exposures of ore on this company's property a very fine showing of copper was found the other day on the Delta Group's Lucky Jack claim.

Six feet of the vein is reported to run 5½ per cent. copper. There are much higher assays from the clean ore.

As soon as communication is established this company intends to prosecute active work on the known orebodies. Good results are expected as they have a number of promising showings.

Mr. Harrison Clement is managing this property for the Delta Copper Company. Most of the financing

is being done from Edmonton, and there is said to be a good deal of capital interested.

### Molybdenite.

The Hazelton View and Indian groups, comprising eight crown granted claims, are owned by the New Hazelton Gold-Cobalt Mines. They adjoin the Rocher Deboile Company's ground on the west and north.

Since last summer a tunnel has been driven on the main gold-cobalt vein on the Victoria claim and a number of high-grade shoots of promising ore have been cut.

An interesting feature of this work has been the development of several shoots of molybdenite ore, which have successively shown richer content. They occur quite distinctly from the gold-cobalt ore shoots and assays show from 5 to 20 per cent. molybdenum.

The company is about to instal a light aerial tram to take ore from the tunnel down the mountain to a point whence it can be packed to the railway, pending the construction of a wagon road.

Stoping is now being commenced on both the gold and molybdenite ores with the intention of making a shipment of each class of ore as quickly as possible.

It is understood that the plans of the company for this season include considerable exploration and development work on the several parallel veins of similar character which lie in their ground. They will also do some work on their copper veins.

### Developing Copper Deposits.

Adjoining the New Hazelton Gold-Cobalt Company's holdings on the west or lower side a group of ten claims is being developed by a Vancouver syndicate. They are at present occupied with the surface work of tracing the extension of the Victoria vein on their property to a point suitable for the starting of a drift tunnel.

The Golden Wonder Group, owned by W. S. Harris and Denis Comeau, of Hazelton, has been bonded to M. W. Sutherland, who has been conducting extensive development work upon it. There is a fine showing of copper ore in a shaft that he is now sinking.

This group is situated at the foot of the west slope of Rocher Deboile Mountain on the Hazelton wagon road and, being only one mile from the railway, is well suited for economical development.

The shaft is now about twenty feet in depth and shows a vein the full width of the bottom, with about two and a half feet of clean chalcopryrite. About fifteen tons have been taken out in the course of the work.

Arrangements are being made to commence shipping the ore that is now being extracted. Assays show an average of eight per cent. copper with samples as high as eighteen per cent.

### Comeau Group.

Work is being carried on at the Comeau Group, which lies on the west slope of Rocher Deboile Mountain, between Hazelton View and the Golden Wonder Group. The owners, Denis Comeau and Magnus Johnson, are driving a tunnel on one of the promising outcrops.

This property had considerable work performed on it last summer and winter, mainly in sinking a winze from the original crosscut tunnel and drifting there; but it has been found impracticable to continue the old workings owing to difficulty with water.

The owners report that, before being driven out by the water, a good shoot of chalcopryrite had been made, fully up to expectations.

### Has New Power Plant.

The Silver Standard Mine is installing a new power



plant, consisting of gasoline engine, dynamo, compressor, boiler plant and shop equipment. It will enable operations at the mine to be carried on to much better advantage.

Erection of a concentrator is now being considered. This would open up much greater possibilities not only for the property itself, but, if arrangements were made to mill custom ore, for the neighboring mines on Nine-Mile Mountain.

There is little doubt that the whole Nine-Mile district would see greatly increased activity if a custom concentrator and separator were established as there are large bodies of milling ore available on the mountain, while at present none of the properties is in a position to maintain its own mill.

#### **Telkwa District Active.**

Reports from Telkwa indicate considerable mining activity in all the surrounding territory. Representatives of a number of well known mining and smelting corporations are at present in the district, examining properties for their principals. Among the companies represented are the Granby Company, the Consolidated Mining and Smelting Co. of Canada, the American Smelting and Refining Co. and the Tonopah Mining Company.

The Tonopah Company has bonded the Wilson Brothers claim near Knoekholdt station on the Grand Trunk Pacific Railway, and it is reported that several other transactions have been made or are in progress.

Work is progressing on the wagon road from Telkwa to Howson Basin and is about to be started on the Babine wagon road. The former will open communication to the Santa Maria Mine now being operated by Dockrill and Jefferson of Telkwa and other properties; the latter will reach the Cronin Mine in Babine Mountain as well as the Dome Mountain camp and other prospective shipping properties.

A complete plant was hauled in to the Santa Maria last winter, a permanent camp built and shipments of ore were brought out by a sleigh road built by the operators. The ore consisted of high grade chalcocite and bornite.

Upon completion of the Babine road the Cronin mine will ship ore and it is expected that the Debuture Mines will also be ready at that time to join the list of shippers.

Prospecting is active on the main branch of the Telkwa River, the Babine Mountains, the Sibola country and to the south of Houston.

#### **Survey of Hazelton District.**

There is a good deal of interest in the work of the geological survey of the Hazelton district, which is being carried on now by Mr. J. J. O'Neill of the Dominion Geological Survey Branch. He is conducting a detailed survey of an area fifteen miles square, embracing all the district immediately surrounding Hazelton and the main working camps.

The topographic survey of the same area is being made concurrently under the supervision of Mr. F. S. Falconer. The resulting maps and reports of these surveys will be of immense value to all who are interested in the district and will greatly facilitate scientific development.

Much satisfaction is expressed in the Hazelton district at the appointment of Mr. J. D. Galloway as engineer in charge of the district, and of Mr. A. L. Carruthers as district engineer, under the Department of Works.

### **RULES GOVERNING STEEL AND IRON SHIPMENTS FROM UNITED STATES.**

The new rules governing steel and iron shipments, which supersede all previous regulations, are as follows:

First—That all shipments to those nations associated with the United States in the war are, until further instructions, to be licensed freely, without reservation, and without restriction, except iron and steel plates, pig iron, iron and steel scrap, and steel billets, for which licenses shall be granted only in case said articles are destined for actual war purposes or will directly contribute thereto.

Second—Licenses which may be properly issued, will be granted for shipments of all iron and steel plates and structural shapes, and other articles properly included under these general headings, under the following conditions only:

(1) The application for such license must be received by the Department of Commerce, Division of Export Licenses, Washington, D.C., on or before August 10, 1917.

(2) Such articles shall be completely made up and manufactured on or before August 10, 1917.

(3) Such license shall be valid, and shall indicate that it is valid, only in case such shipments are covered by railroad or ocean bill of lading dated on or before August 15, 1917.

With respect to the general term "Explosives," used in the proclamation of the President on July 9, 1917, the following chemicals are included in its meaning:

Ether, alcohol, sulphur, sulphuric acid and its salts, acetone, nitric acid and its salts, derivatives of benzol, phenol (carboic acid) and its derivatives, derivatives of tolnol, mercury and its salts, ammonia and its salts, glycerine, potash and its salts, all cyanides.

#### **TUNGSTEN.**

No metal has had the wide-price range that tungsten has encountered since the war began, the current quotation of \$25 per unit comparing with normal quotation of \$7 and high record figure of close to \$90. It has been a matter of supply and demand with requirements far exceeding available stocks at one time, but later succeeded by larger production induced by the high prices.

The United States has never figured as a material factor in the production of this metal, practically all the product being imported from South America. Up to the first of June there had been brought into the United States from abroad during the past fiscal year a total of 3,480 tons of tungsten bearing ore having a value of \$4,601,204. No comparison can be made owing to the fact that prior to this year the Government kept no separate records of the movement of this metal.

Throughout the West tungsten-bearing deposits have been opened up and profitably worked in some instances and the aggregate production therefrom has gone far to meeting domestic demand.

High grade tool makers use tungsten very heavily and under the pressure of their demand after the war started tungsten jumped by leaps and bounds to the equivalent of \$5,250 a ton against a normal price of \$120. This demand has now been very largely met, resulting in quiet conditions now prevailing in the tungsten market. — Boston News Bureau.



**DR. C. W. DRYSDALE'S WORK.**

In an article in the Daily Colonist, Mr. E. Jacobs says:

Some of those who are familiar with the considerable and valuable work done in B. C. by the late Dr. Charles W. Drysdale, of the Geological Survey of Canada, are desirous of promoting a movement having for its object endeavors to induce the Dominion and Provincial Governments to each make a grant for the benefit of his widow and three young children, the regulations of the Dominion service with which he was connected not making sufficient provision in such a case as this. With a view to showing its extent and nature, the following outline of the work of the deceased geologist has been prepared:

The first mention I remember having seen made of Dr. Drysdale's work was the acknowledgment in the Geological Survey Summary Report for 1908, in which (on page 65) Mr. O. E. LeRoy stated that in making a detailed geological survey of Phoenix camp, in Bonndary district, he "was most ably assisted by Mr. C. W. Drysdale."

In the Summary Report for 1909 (p. 131) Mr. LeRoy stated that in his work of geologically mapping the Sloean map area he "was assisted in a most efficient manner by Mr. C. W. Drysdale," and he bore similar testimony in the Summary Report for 1910 (p. 123) concerning geological work in Ainsworth and Sloean mining divisions.

The field season of 1911 found Dr. Drysdale doing geological work in Franklin camp, in the northeastern part of Boundary district, and in the Summary Report for that year (pp. 133-138) there was included his preliminary report of his work in connection with completion of a detailed geological map of that camp, while in 1915 there was published Memoir 56, Geological Series 56, "Geology of Franklin Camp, B.C.," by C. W. Drysdale.

In 1912, much of the field work done by the Geological Survey was in preparation for the excursions of members of the International Geological Congress arranged to be held in Toronto the following summer. That congress was attended by many of the most noted geologists of the world, and an appreciably large number of them took part in the Transcontinental Excursion to the West. Dr. Drysdale's part in preparing to place knowledge at the disposal of those eminent scientists, in particular, and the general public at large, was to geologically map a section ten miles wide along the Thompson River Valley between Sixmile Point, Kamloops Lake, and Lytton, this being part of the important work done to make "a complete geological section across the Canadian Cordillera, from Vancouver to Banff, along the Canadian Pacific Railway." His description of the geology of the country from Savona to Lytton, printed in Part II. of Guide Book No. 8 (pp. 234-256), was, in common with that of others also included, in this way given wider publicity than geological reports usually obtain. In addition, there was printed in the Summary Report of the Survey for 1912 (pp. 115-150) his official report on the "Geology of the Thompson River Valley Below Kamloops Lake, B. C."

With the exception of one month, given up to International Geological Congress business, Dr. Drysdale spent the field season of 1913 at Rossland. In 1905 and 1906, Professor R. W. Brock and Dr. G. A. Young, both of the Geological Survey, had been engaged in making "a detailed geological survey of the Rossland mining camp," but, as was the case with the Lardean,

Mr. Brock failed to complete the promised geological report, the only result of his work made public having been a pamphlet issued in 1906 as a preliminary report, the greater part of which was information such as an ordinary newspaper writer would have compiled at very much less expense. Eventually to keep faith with those interested in Rossland, Dr. Drysdale was allotted the work of completing this long waited geological report, with the result that in 1915 the Survey published Memoir 77, Geological Series 64, "Geology and Ore Deposits of Rossland, B.C.," a volume containing more than 300 pages, freely illustrated and accompanied by topographic and geological maps, altogether comprising a most valuable work on a mining region that has made a total production officially valued at more than \$70,000,000 and still one of the most important of the productive mining camps of British Columbia. This work will long remain a striking testimony to the zeal and industry displayed by Dr. Drysdale.

It may here be mentioned that on the initiative of myself in my capacity of secretary of the Western Branch of The Canadian Mining Institute, at a meeting held on October 26, 1916, the following resolution was passed:

"Be it resolved, that the residents of Rossland and district generally, through representatives attending the twenty-third meeting of the Western Branch of The Canadian Mining Institute in convention assembled in the city of Trail, B.C., express to the directors of the Dominion Geological Survey their sincere thanks for his interest in the development of the mineral resources of the country, in authorizing the completion of the structural survey of the Rossland camp; and be it further

"Resolved, that we express our hearty appreciation of Dr. Charles Wales Drysdale's valuable contribution to Economic Geology in the work entitled "Geology and Ore Deposits of Rossland, British Columbia."

In moving this resolution, Mr. M. E. Purcell, superintendent of the Centre Star-War Eagle mines, said, in part: "Mr. R. W. Brock had spent considerable time in Rossland making a detailed structural survey of the camp several years since, but for some unexplained reason the work so ably begun was never finished by him, and all that the people of Rossland had to whet their desire for information as to the potential mineral resources of the camp was a brief preliminary report of less than forty pages. I learned later that the reason the detailed report was delayed was because Mr. Brock's duties as director of the survey took up all of his time, and that men equal to the magnitude of the work at Rossland were not easy to find, but that as soon as a suitable man should be available, the work would be finished and the complete report written. It gives me great pleasure to say that in Charles Wales Drysdale the right man was found, and the delay in completing the report on the Rossland camp has since been completely justified. It is perhaps fitting in the absence of men better qualified for this duty, who have been prominent in the development of Rossland's great mines in the past, that one who has also been intimately and continually associated with the development of the camp's mineral resources for about twenty-one years, should, on behalf of Rossland and neighborhood, present the foregoing resolution."

Mr. S. G. Blaylock, assistant general manager for the Consolidated Mining & Smelting Company of Canada, Limited, said: "It affords me much satisfaction to support the resolution that this meeting expresses



sincere gratitude to Dr. Drysdale for his able work on the Rossland camp. The work which Dr. Drysdale has accomplished in this region can only be appreciated thoroughly by those who know the Rossland camp. He has solved numerous problems, and pointed out a great many things that were not before known to any of us. His work was all the more valuable in that as it progressed, he instructed various men interested in the district in the different rock formations and ore bearing measures, so that we did not have to wait a long period of time until his completed report could be issued, before we could take advantage of the knowledge he gained at Rossland. I may say that his findings have been of very real value in laying out development work in mines of the camp. I am sure we will give Dr. Drysdale every credit, and wish him the great success he deserves."

After having spent several weeks of the early part of the 1914 field season in Rossland camp, and in examining recent developments in mining in Franklin camp, Dr. Drysdale was engaged during most of the season in making a detailed examination of Ymir mining camp, preparatory to mapping an area of about 145 square miles in Nelson mining division, lying between Hall, ten miles south of Nelson, on the Nelson and Fort Sheppard Railway, and Salmo. Memoir 94, Geological Series 76, "Ymir Mining Camp, B.C.," published early in 1917, by the Geological Survey, gives more information concerning an easily accessible mining region, than, perhaps, is obtainable in any other similarly convenient form. Before returning to Ottawa for the winter, Dr. Drysdale gave attention for some days to gold mines in Sheep Creek camp, some copper occurrences in the North Fork of Salmon River, and the Molly molybdenite mine on Lost creek, also in Nelson division.

The first detailed official description of that molybdenite property, together with other most acceptable information relative to molybdenite, made available to the public was that contained in Dr. Drysdale's paper entitled "Notes on the Geology of the Molly Molybdenite Mine, Lost Creek, Nelson Mining Division, B.C.," read at a meeting of the Western Branch of the Canadian Mining Institute held in Rossland on July 15, 1915. Two or three months later, the property was visited by the Provincial Assistant Mineralogist, but his account of it was not made public until fully a year after Dr. Drysdale's paper was presented.

During the main part of the field season of 1915, Dr. Drysdale was engaged in geologically mapping the Bridge River area, Lillooet mining division, and there he paid "special attention to the working mines of the district and other mineral occurrences." At the close of the season he devoted a short time to examining a few of the chief mining properties in the Highland Valley copper camp, situated about 27 miles southeast of Ashcroft, B.C. A preliminary report on Bridge River map-area and some notes on Highland Valley copper camp were printed in the Summary Report for 1915 (pp. 75-91).

As the Geological Survey Summary Report for 1916 has not yet been received, I am without information concerning Dr. Drysdale's field work in that year. He was assigned to do further geological work in British Columbia this year, and was on his way to the scene of his intended activities in Windermere division, East Kootenay, when on July 11, ultimo, he was drowned when trying to cross the Columbia River on a raft.

Of all the men who in recent years have done field work in British Columbia in connection with economic

geology, the opinion may be expressed that he was distinctly in the lead. Highly efficient, untiring, assiduous in his investigation, and diligent in preparing for publication the results of his work, he set an example that it would be to public advantage to have emulated by some of the go-easy officials whose leisurely procedure causes unreasonable delay in the publication of information that would be much more valuable if quickly made available for use. Added to these high qualifications for his important work, were kindness and courtesy that freely and generously responded to inquiry concerning problems and difficulties met with in mining, so that all who came into contact with him in the field or underground appreciated his pleasing personality. It is to be hoped that appreciation of his most valuable work in British Columbia will not be restricted to empty words, but that it will rather find expression in substantial provision for his widow and children left, it is feared, without adequate means to meet their needs beyond the immediate future.

### INCREASE IN U. S. COAL PRODUCTION.

The Committee on Coal Production in the United States in a recent letter to operators says in part:

We call upon the coal operators and miners of the United States to rise to the present national emergency—to render the best service that is in them in advancing the cause of our country in the great struggle for democracy as opposed to autocracy—and we urge that all elements of society make sacrifices to support the flower of American manhood, who will soon go forth in battle to uphold the principles of freedom, justice and humanity. As we operators and miners cannot all fight in the trenches, we can and must do our part in the war by working as earnestly, constantly and faithfully as our armies will fight gallantly on the battlefields of Europe.

Response has been made to our last appeal, and the coal production has been increasing sufficiently to warrant the belief that there will be a sufficient supply of coal to meet the requirements of consumers in the United States. The bituminous coal loaded at the mines in May was 24 per cent. more than in May a year ago, and 2 per cent. more than in April of this year. In June, 1917, the increase was 26 per cent. above the output of June, 1916. This means that in June, 1917, a new record was established, with a production of nearly 17,000,000 tons of bituminous coal. This gratifying record was even exceeded in July. Yet not enough coal is being mined to meet the increased requirements, estimated at ten million tons annually, which will be necessary to supply the growing needs of our allies, for the bunkering of fleets which will transport our troops and supplies to France, and for Cuba and South America.

It is not the intention of this committee to seek to arbitrarily restrict the normal activities of operators or miners, but we are interested, as the whole nation must be, in maintaining uninterrupted operation in the coal mining industry and in securing at all times the maximum production of coal. This committee, representing the coal operators and miners, renders great service in promoting good will and harmony in the coal industry and in co-operating for the purpose of bringing about the adjustment of differences between operators and miners to the end that production may be increased.



**MOND NICKEL COMPANY, LIMITED.**

The third ordinary general meeting of the Mond Nickel Company, Limited, was held July 27 in London. Mr. Robert Mond, J.P., chairman of the company, presiding.

The chairman said, in the course of his address, that the balance carried to profit and loss account was £327,248, as compared with £322,589 last year, and with the balance brought forward there was £410,193 (compared with £360,622 last year) available for division. The directors proposed, after paying the preference dividend, to declare a final dividend of 15 per cent. on the ordinary capital (on which an interim dividend of 5 per cent. was paid in February), placing £50,000 to reserve account and carrying forward £111,598. Last year a provision was made for war taxation in the carry forward, which had since been dealt with. The fourth unit, at Clydach, had been in successful operation during the year; the erection of the fifth unit was progressing favorably, and preliminary steps were being taken towards the erection of a sixth unit, to follow on when the fifth was completed. They had also during the year acquired at very reasonable prices a large adjoining farm, covering some 300 acres, which would enable them to extend their building operations when so desired. The Clydach Estates Company—of which they held all the shares—had been steadily developing its building estate. The projected increase of the works by the two new units made the proper housing of the additional workmen required essential.

In Canada, the increase of the smelter in preparation for supplying the matte necessary for six units, and the corresponding development of the mines, were nearing completion, whilst very extensive explorations had disclosed further large extensions of the ore in their existing mines, which provided ample reserves for a long period.

During the year they had a visit from the Royal Ontario Nickel Commission, who had since published an extremely able report. The legislation passed at the last session of the Ontario Parliament, on the recommendation of this report, with regard to both taxation and refining in Canada, in no way prejudiced the interest of this company.

To enable them to improve relations with the workmen, the board has elaborated a new scheme, to give the company the opportunity to discuss with the men at regular intervals any questions relating to wages and labor conditions, and to provide automatically for the varying increase in the cost of living due to the war, and to allow the remuneration of labor, so far as it should be affected by other considerations, such as responsibility and hardness of the work, to be dealt with separately. It was consequently arranged that there should be three meetings at regular intervals between the Union, the representatives of the men, and the board, during the year, at which all questions referring to conditions of work might be brought up and thoroughly discussed, the same months being chosen as those agreed upon by the Amalgamated Society of Engineers. No changes of wages were to take place in the intervals between these meetings, nor were any questions with regard to the alteration of wages to be brought up.

The figures in the "Board of Trade Labour Gazette," showing the average increase in the cost of living over pre-war figures for the month previous to the meeting, were to be adopted as the standard, and the wages of

the lowest class of labor to be increased by that amount; and the sum thus ascertained added to all other classes of unskilled or ordinary labor. This figure would be the standard figure for the succeeding four months, and would vary with the figures published in the "Board of Trade Labour Gazette."

The report was adopted, and the retiring directors and auditors were re-elected.—Mining Journal, London.

**TEMISKAMING.**

The directors of the Temiskaming Mining Company have sent to shareholders a letter, dated August 28th, in reply to circulars published by Mr. H. B. Wills and Mr. Max Morgenstern. The directors say in part:

A summary of the management of your property since your directors assumed control in March, 1914, is as follows:

There was turned over to us—

Quick assets consisting of	
Cash in bank .....	\$ 77,173
Due from smelters .....	39,853
Ore at mine (estimated) .....	20,442

Total .....	\$137,469
Less accounts payable .....	21,164

Available balance ..... \$116,304  
We found—

Mill ore bins empty—

No high grade ore in sight—

Mill running at about half capacity on account of lack of mill ore and inefficient equipment.

From August 1st, 1914, to October 1st, 1914, we were forced to close the property on account of labor troubles. While mining operations were suspended, we made necessary extensive repairs to mine buildings, and improved sanitary conditions, all of which at a cost of several thousand dollars.

August 1st, 1917—

The mill ore bins are full.

The mill is running at full capacity.

There are between 8,000 and 10,000 tons of ore on timbers underground ready to be taken to the mill.

The plant is in a high state of working efficiency.

Surface buildings all in thorough repair.

Sanitary conditions A-1.

In addition to the betterments which have cost several thousand dollars, we have paid to the shareholders Dividends amounting to ..... \$525,000 and have quick assets as of August 1st, 1917, as follows:—

Cash on hand and in banks .....	\$246,560
Bullion in storage. ....	222,572 oz.
Due from smelters. ....	42,161 oz.
Ore bagged at mine (estimated) .....	99,556 oz.

Total .....	364,289 oz.
at 79c. an ounce, the official price of silver on August 1st .....	287,788

534,348

\$1,059,348

Deduct balance as of March 31st, 1914 ... 116,304

Leaves a net profit in a little over three

years' time of ..... \$943,044

And these figures do not include any estimate of ore broken down or in place in the mine.



**SHIPPING FLUORSPAR FROM MADOC.**

A new shipper of fluorspar from Ontario is the Wallbridge mine. This property is now being developed and a carload of fluorspar has been sold.

There is a good demand for fluorspar and the price is much higher than normal. Sales in New York recently were at around \$22 per ton for 75 per cent. ore.

Messrs. Cross and Wellington, Madoc, have during the past year made several shipments of fluorspar to the iron furnace at Hamilton.

The new producer is near that of Messrs. Cross and Wellington. The accompanying photograph was taken May 19, 1917.



Wallbridge fluorite mine, Madoc, Ont.

**FLUORSPAR.**

American mines broke another record last year in the production of fluorspar, as shown by statistics compiled under the direction of Ernest F. Burchard, of the United States Geological Survey, Department of the Interior. In 1916 the shipments were 155,735 short tons, valued at \$922,654, an increase of 14 per cent. in quantity and of 21 per cent. in value over the shipments of 1915, heretofore the record year.

The increased demand for fluorspar has come largely from the manufacturers of open hearth steel, who use the mineral as a flux, but the demand for it in other metallurgic operations and for the manufacture of

hydrofluoric acid has been very active. One of the newer uses for fluorspar is as a reagent in the recovery of potash from feldspar and from Portland cement clinker.

The bulk of the fluorspar sold in 1916, as in former years, was gravel spar, the quantity in 1916 amounting to 133,651 short tons, or nearly 86 per cent. of the total. The average prices per ton received at the mines in 1916 were, gravel \$5.34, lump \$7.94, and ground \$12.38, and the general average price for all spar sold was \$5.92. These prices compare with \$4.89, \$7.51, \$10.80, and \$5.58, respectively, in 1915. At the close of 1916, owing to a shortage in supplies, the price of gravel spar for prompt delivery, not covered by contracts, was about \$21.50 per ton, although it is believed that not much was sold at this price.

**SENECA-SUPERIOR AND UNITED KIRKLAND.**

During the past few weeks Toronto mining brokers interested in the flotation of United Kirkland have issued statements connecting Seneca-Superior interests with the United Kirkland enterprise. These statements are likely to mislead readers. Enquiry at the office of Seneca-Superior permits us to say that neither that company nor its chief shareholders is interested in United Kirkland. So far as we can learn the only connection is that one director of Seneca-Superior owns a share in an option on United Kirkland which has not yet been exercised.

**STANDARD MOLYBDENITE CO., LTD.**

The prospectus of the Standard Molybdenite Co. has been received. The company is to be capitalized at \$150,000. The office is at 265 Queen St., Ottawa. Shares of \$1 par value are being offered at 25 cents. The company is being organized to secure the mining rights to property in Wright County, Quebec. The prospectus states that "this property is situated in the same range of mountains as the mine owned by the Canadian Wood Molybdenite Co." As to profits, we read "it is estimated that the cost of mining, transportation, and concentration of the ore will not exceed \$10 per ton, leaving a profit of from \$22 to \$70 per ton." Unfortunately no facts are presented to substantiate the statements made.

**SENECA-SUPERIOR.**

The fifth annual report of Seneca-Superior Silver Mines, Ltd., has been issued. The Seneca mine has been worked out and is closed down after a brilliant career. The financial summary covering the period from incorporation, January 31, 1913, to December 31, 1916, shows a production valued at \$2,191,280 and dividends of \$1,579,817.

An interesting feature of the report is the summary of costs. Royalty amounted to 13.33 cents, war tax 0.28 cents, and mining, marketing, etc., 15.77 cents per ounce.

**AN ALLUVIAL GOLD FIND.**

Mr. Louis Gendreau, Jersey Mills, Beauce Co., Quebec, reports that a farmer showed him a piece of alluvial gold found last week on the edge of a brook crossing his farm. Heavy rains early in August changed the courses of streams and will make prospecting easy.



**LADYSMITH SMELTER.**

After being closed down for five years the big smelter at Ladysmith, on Vancouver Island, has just been reopened. The 20,000 tons of ore necessary as a supply before the furnaces could be blown in has been collected.

This is one of the most important events in British Columbia mining developments since the war started and will go a long way towards fostering and maturing the very considerable activity that is now taking place on the island, as well as in other parts of the province.

One of the great advantages of the smelter will be its arrangements for treating local ores. The plant is of sufficient capacity to handle the entire output of the island for many years to come, and present and prospective owners will be able to proceed with development work in full confidence of having adequate smelting facilities.

It was in 1901 that the smelter, then known as the Tyee smelter, was erected. It was located at Ladysmith because of the advantageous position, cheap transportation rates being available from most parts of the province.

The plant was closed down in the latter part of 1911 and has remained idle ever since. Last autumn it passed into the hands of the Ladysmith Smelting Corporation and that concern has arranged numerous contracts for ore that will ensure a constant and adequate supply.

The president of the company is Colonel Stevenson, who is well known in provincial mining circles and has long been associated with important mining interests in British Columbia and in Alaska. He is one of those controlling the Alaska Corporation, which operates in conjunction with the Ladysmith smelter. Mr. H. W. Aldrich is superintendent of the plant.

Naturally there is deep interest in mining circles as well as among business men generally as to the effect the operation of the smelter will have upon the movement of ore into the United States. At present large quantities are shipped to the Tacoma smelter and it appears likely that a considerable portion of that ore will in future be sent to Ladysmith.

The Ladysmith Corporation has announced a treatment charge of \$5 per ton. All of the copper will be paid for, but a deduction of four-tenths of one per cent. will be made from the wet assay.

The price paid for copper will be three cents a pound less than New York quotations ninety days after the receipt of the ore; 95 per cent. of the gold content will be paid for at \$20 per ounce, but if there is less than a tenth of an ounce per ton it will not be paid for; 95 per cent. of the silver will be paid for at New York quotations ninety days after sampling, but the ore must assay over 0.5 ounce in order to be paid for.

An advance of 60 per cent. of the value of the ore content at current prices will be made, but the shipper must pay seven per cent. interest for the advance.

Tacoma, with which Ladysmith is in direct competition, issues two schedules, of which the shipper may make his choice. The charge for treatment is \$1.50 per ton, \$3.50 less than the Ladysmith rate.

In both Tacoma schedules 95 per cent. of the gold and silver content is paid for, but no gold under three-tenths of an ounce or silver under one ounce per ton is paid for. On this point the Ladysmith terms are better.

Under schedule A of the Tacoma smelter 100 per cent. of the copper is paid for after deducting 1.3 for wet assay. Then there is a deduction of three cents

a pound from the market price. When copper is quoted higher than fourteen cents a pound only 75 per cent. of the excess is paid for—which means that the smelter claims 25 per cent. of all the copper value over fourteen cents, after deducting 1.3 for wet assay and three cents a pound in addition.

Under schedule B of the same smelter, the same percentages of value are allowed, but preliminary settlement will be made on the basis of copper at fourteen cents and silver at 55 cents. Final settlement will be made 120 days after sampling, on the basis of the average New York quotations for a week prior to the expiration of the 120 days.

If the final quotation is in excess of 18 cents a pound for copper the treatment charge is advanced from \$1.50 to \$2.50 per ton. Any shipments under five tons are charged \$10 flat for sampling in addition to the treatment charges and reductions.

A comparison of the Ladysmith and Tacoma rates shows that the former is generally the most favorable.

**AMERICAN CYANAMID CO.**

Montreal, Aug. 13.—The American Cyanamid Co. reports net profits of \$638,648 for the year ending June 30 last, against only \$58,583 two years ago, when the company's business was demoralized by the war. Profits, as shown, were equal to slightly more than eight per cent. on the \$7,895,200 preferred stock outstanding at the end of the year. During the past twelve months the company acquired the entire capital stock of the Ammo-Phos Corporation, which is to begin manufacturing a new fertilizer material, ammonium phosphate, this month, and has already been producing sulphuric acid and sulphate of ammonia. With this corporation was also acquired in the same transaction the Amalgamated Phosphate Company, which owns phosphate rock mines in Florida.

The annual report notes that:

"The demands upon your company's treasury to defray the cost of the phosphate mines extensions (the capacity of the mines being doubled, coupled with the extensions and improvements at the Ammo-Phos plant and at Niagara Falls, have been such, together with the undue risk at this time of the world's history in assuming large loans, as to involve the necessity of passing the dividend on the preferred stock, amounting to 6 per cent. for the fiscal year ended June 30, 1917. The preferred stock is cumulative, so that this action is only a deferment; all accrued dividends on the preferred stock must be discharged before any dividends can be paid on the common stock. Your directors have taken this action with the conviction that this reinvestment of earnings in plant extensions and improvements at this time will result in extraordinary and immediate benefit to holders of both the preferred and common stock."

Net sales for the past year amounted to \$2,705,053, against \$1,881,532 the preceding year. Contracts for delivery in the current year already in hand are placed at \$2,025,811.

The balance sheet shows current assets of \$1,343,328, of which \$105,066 is cash, against current liabilities of \$684,443, including \$359,114 notes payable. Surplus account, which was \$232,283 a year ago, stands at \$525,402, after deducting \$148,951 for losses sustained through dismantling part of the Niagara Falls plant, and \$196,578 for deferred dividend paid last December. Accrued dividends due on the preferred stock amount to \$439,837.



**PERSONAL.**

Mr. W. E. Segsworth has returned to Toronto after a trip to industrial centres in the Maritime Provinces. He expects this month to visit the Western Provinces to see what facilities are available for the industrial training of returned soldiers.

Mr. J. B. Tyrrell is in British Columbia.

Mr. N. S. Clarke, for years engaged in developing mineral claims on the west coast of Vancouver island, has returned to Victoria, B.C., from a visit to Montana.

Mr. Frederic Koffer, of Spokane, Washington, president and general manager of the Highland Valley Mining and Development Co., operating a copper mine and concentrating plant in Ashcroft mining division of British Columbia, was in Victoria on a business visit about the middle of August.

Mr. James Cronin, of Spokane, who is developing a mining property situated in the Babine Mountains, Omineca division of British Columbia, recently examined some mineral claims in East Kootenay.

Mr. B. H. Bennetts, of Tacoma, Washington, is at the Ladysmith Smelting Corporation's smelter on Vancouver island, to supervise the installation there of a copper converting plant.

**THE BITER BIT.**

The following is an editorial from the Houghton Mining Gazette:

"On several occasions an I. W. W. agitator in Butte declared in public speeches that city ordinances, the laws of the country, even the constitution of the United States, are mere scraps of paper, which should be torn up and disregarded; that the city fathers should be told to go to hell, along with their ordinances and laws. He asserted the I. W. W. would keep Uncle Sam so busy that it will not be possible to send soldiers to France. He made many other utterances of like import. Then, early one morning, a band of men who had conveniently accepted his doctrine for the moment, took this unbeliever in laws, this man who had no regard for authority and who was a law unto himself, and hanged him to a railroad trestle. It was a lawless finish of a lawless man, and the act of lawless men. Yet he had invited the practice of the lawlessness he preached. He was the victim of the very violence he upheld and encouraged. The I. W. W. not only is a dangerous menace to society but, fortunately, its entire outlook on life, and the destructive character of its practices, constitute as great a menace to itself."

**U. S. IRON ORE PRODUCTION.**

The iron ore mined in the United States in 1916 reached a total of 75,167,672 gross tons, the greatest annual output ever made. The shipments from the mines in 1916 were 77,870,553 gross tons, valued at \$181,902,277. The quantity mined in 1916 was more than 19,600,000 tons greater than that mined in 1915. The increases in quantity and in value of iron ore shipped in 1916 amounted to about 40 and 80 per cent., respectively. The average value per ton at the mines in 1916 was \$2.31, as against \$1.83 in 1915. These figures, which were compiled under the direction of E. F. Burchard, of the United States Geological Survey, Department of the Interior, include for 1916 only iron ore containing less than 5 per cent. of manganese.

**SPECIAL CORRESPONDENCE****BRITISH COLUMBIA.**

Generally, reports from the various camps in which metalliferous mines are being operated, are favorable. Much development work is being done; the outlook for an increased output of ore is believed to be encouraging; in several instances additions are being made to plant and machinery; prices of metals continue high enough to leave a good margin of profit to most operators producing ore, and on the whole there is much in the mining situation to warrant the expectation of the industry being in a flourishing condition in the future.

**East Kootenay.**

There is little to add to last month's notes concerning mining in this district. Coal-mining and coke-making operations are once more in full swing, so far as the restricted supply of labor will allow them to be. Shipment of lead and zinc ores from the Sullivan mine is comparatively large with a total of 10,553 tons for the month of July, and 756 tons for the first week in August, while several smaller mines in Fort Steele, Windermere, and Golden divisions have also shipped ore lately.

**West Kootenay.**

**Ainsworth.**—Mines in this division from which ore has been received at Trail since July 1st are the Bluebell, Cork-Provance, Florence, Highland, Retallaek, and Spokane Trinket. The chief developments have been the starting of the Florence Silver Mining Co.'s new concentration mill, the installation of concentrating plant at the Silver Hoard, encountering of ore in a low-level crosscut adit drive on the Crescent-Eden property, the resumption of work in the Cork-Provance mine and concentrator and the satisfactory showing of ore opened in the Utica mine at depth. Work is being continued in the Skyline, on several properties higher up the South Fork of Kaslo creek than the Cork-Provance, on Retallaek & Co.'s group near White-water, and at the Bell zinc mine in Jackson basin. The resumption of operations at the concentrating mill in Kaslo, where zinc-lead ore from the Lucky Jim mine is treated, is another satisfactory evidence of progress.

**Slocan.**—The mines in Slocan mining division that were on the Trail smelter list as ore shippers during four weeks ended August 7 were the Freddie Lee, Galena Farm, Idaho-Alamo, Lucky Jim, Lucky Thought, Queen Bess, Rambler Cariboo, Slocan Star, Standard, Surprise, Van-Roi and Wonderful, and the Ottawa in Slocan City division. Total of receipts from these mines for the period mentioned was 2,610 tons, much of it of silver-lead concentrate, with the remainder either crude silver-lead ore or zinc concentrate. There are other properties on which development work is being done, but from which no ore is being shipped. The Slocan Star Co. is reported to be making a fair profit above cost of operating; the Rambler Cariboo Mines, Ltd., has declared another dividend, payable on September 1, total amount \$17,500; the Standard Silver-Lead Co. distributed \$100,000 as a dividend, which was paid on July 1st, and the Lucky Jim has arranged to make a second payment of 25 per cent. to its company's unsecured creditors.

**Nelson.**—Few mines in Nelson division have been on the shipping list of late, the chief exception having been the Emerald lead mine, near Salmon, in the southern part of the division. Between 30 and 40 men have been employed at this mine in recent weeks, and five horse teams have been hauling ore to the rail-



way at Salmo, a distance of eight miles, shipments to Trail having totalled 959 tons in June, July, and the first week in August. Recent news is that a concentrating plant has been purchased and will shortly be removed from its present situation, near Chesaw, Washington, to a suitable site within easy reach of the Emerald mine. Mr. W. J. Barker, for many years superintendent of mines of which the late Mr. Leslie Hill was in charge, is now superintendent of the Emerald.

The stamp mill in connection with the Granite-Poorman group of gold mines, near the town of Nelson, is being operated, there now being sufficient ore opened to keep it going. More machinery and plant has been added lately, and provision is being made for further mining development and increased stamp-milling operations.

**Rosslund**—It is noteworthy that shipment of ore in considerable quantity from Rosslund mines to the Consolidated Mining and Smelting Co.'s smelting works at Trail was resumed in the first week in August, receipts from that camp having been as follows: From Centre Star mine, 1,137 tons; from Le Roi mine, 1,421 tons; from White Bear mine, 202 tons; total for week, 2,760 tons. There had been a practical suspension of ore production at the Centre Star and Le Roi mines, both owned by the Consolidated Co., during a period of four months, their total output of ore shipped in that time having been but 1,618 tons. The shipment from the White Bear, mentioned above, was the first from that mine for a number of years, the mine having long been inactive until recently when the Consolidated Co. commenced further developing it, presumably under an option of purchase. Pending resumption of smelting of Rosslund ores at Trail, the Le Roi No. 2, Ltd., has been shipping ore from its Josie group of mines to the Ladysmith Smelting Corporation's smelter on Vancouver Island.

**Trail**—There was a decided increase in the quality of ore received at the Consolidated Co.'s smelting works here during the first week in August as compared with all other seven-day periods since the first week in April. A comparison of average daily totals is as follows: For the three months ended March 31, last, the daily average was 1,350 tons; for the month of April it was 830 tons; for May, 514 tons; for June, 571 tons; for July, 669 tons, and for the first week of August, 1,169 tons. During recent weeks the receipts included 186 tons from the Venus mine, in Southern Yukon, and 1,642 tons from the Mandy mine, in Manitoba. It is stated that one of the copper blast-furnaces was blown in early in August. During the period of shortage in coke supply the lead stacks were kept in operation to the extent found practicable, but the copper furnaces were all blown out when it was found that coke could not be obtained in sufficiently large quantity to admit of both copper and lead furnaces being kept in blast.

#### Boundary.

Late reports are to the effect that there are now six furnaces in blast at the Granby Consolidated Co.'s copper smelting works at Grand Forks, and that once again the Canada Copper Corporation's smelter at Greenwood is being operated.

Apart from the big mines situated in the Boundary district that the above-mentioned companies are working, there are a number of smaller ones to which attention is being given. In Burnt basin, in Franklin camp, and in other parts of Grand Forks division, progress is being made, while in various parts of Green-

wood division, from the Emma mine in the eastern part away to Beaverville in the western part, work is being done in more or less important degree.

#### Similkameen and Nicola.

The Hedley Gold Mining Company is finding difficulty in getting mine-workers. Miners are being paid \$4.25 a day, muckers \$3.75, and laborers \$3.50, but there is still a shortage of men.

The Princeton Coal and Land Co. has an active demand for coal from its colliery at Princeton, so that its coal mine is running pretty well to present capacity.

The Canada Copper Corporation is making financial arrangements that will admit of the erection and equipment of a 3,000 tons a day concentrating plant, to include flotation, being proceeded with, to provide for treatment of ore from its Copper Mountain property.

In Nicola Valley, preparations are being made to resume work on the respective properties of the Donohue Mines, Ltd., and the Aberdeen Syndicate. In other parts of Nicola district mineral claims are also being developed, while coal-mining is receiving the usual amount of attention as well.

#### Coast.

Production on a large scale is being continued at the mines of the Britannia Mining and Smelting Co., near Howe Sound, Vancouver mining division. On Texada island there is the usual work in progress at the Marble Bay copper mine, and at others of less present importance.

Metalliferous mining on Vancouver island is more active this year than for a number of years. Ore is being mined at the Indian Chief mine, Sidney inlet, and the erection of a concentrating mill has been undertaken. In Quatsino division, mining work is being done at the old Yreka mine, from which a shipment of ore was made lately to Ladysmith, and much development work is being done at the Coast Copper Co.'s Merry Widow group. Near Cowichan lake, the Blue Grouse is making occasional small shipments, while lower down the island, at Sooke, in Victoria mining division, there is being opened a promising showing of copper ore.

#### STANDARD SILVER-LEAD MINING COMPANY.

The Standard Silver-Lead Mining Company, operating at Silverton, Sloean mining division of British Columbia, earned \$34,293 net in June, according to a report issued from the office in Spokane, Washington, on August 13. This is compared with \$36,434 in May.

The receipts were \$77,636 as compared with \$83,606 in May. They include \$44,458 in preliminary settlement on 261 tons of ore and \$22,795 on zinc sales.

The disbursements were \$36,697 as compared with \$28,477. They include everything from ore production to workmen's compensation. The relative operating profit was \$40,939 as compared with \$43,202, and the actual operating profit \$34,685 as compared with \$36,809. The difference between relative and actual operating profit is the cost of development. For development, \$6,254, of which \$1,993 was for supplies and \$4,261 for labor.

The surplus was \$301,247 on June 30. The cash in bank was \$261,345. A credit of \$79,815 is taken for ore shipped but not settled for. The obligations were \$39,910 on payroll and vouchers.

## MARKETS

## STANDARD STOCK EXCHANGE.

J. P. Bickell & Co., Toronto, report the following quotations as close of August 23, 1917.

Silver.	Asked.	Bid.
Adanac . . . . .	.18 <sup>3</sup> / <sub>4</sub>	.19
Bailey . . . . .	.03 <sup>3</sup> / <sub>4</sub>	.04
Beaver . . . . .	.36	.36 <sup>1</sup> / <sub>2</sub>
Buffalo . . . . .	1.12 <sup>1</sup> / <sub>2</sub>	...
Chambers F. . . . .	.15	.16
Coniagas . . . . .	3.50	4.25
Crown Reserve . . . . .	.26 <sup>1</sup> / <sub>2</sub>	.27 <sup>1</sup> / <sub>2</sub>
Foster . . . . .	...	.04 <sup>1</sup> / <sub>2</sub>
Gifford . . . . .	.04	.04 <sup>1</sup> / <sub>2</sub>
Great Northern . . . . .	.07	.07 <sup>1</sup> / <sub>2</sub>
Hargraves . . . . .	.13 <sup>1</sup> / <sub>2</sub>	.14
Hudson Bay . . . . .	35.00	38.00
Kerr Lake . . . . .	5.00	5.90
Kenabeck . . . . .	.24 <sup>1</sup> / <sub>2</sub>	.25
La Rose . . . . .	.49	.52
Lorraine . . . . .	...	.09
McKinley . . . . .	.59 <sup>1</sup> / <sub>2</sub>	.60
Nipissing . . . . .	8.30	8.50
Ophir . . . . .	.08 <sup>3</sup> / <sub>4</sub>	.08 <sup>3</sup> / <sub>4</sub>
Peterson Lake . . . . .	.11 <sup>1</sup> / <sub>2</sub>	.12
Right of Way . . . . .	...	.05 <sup>1</sup> / <sub>2</sub>
Rochester . . . . .	.02	.03
Seneca . . . . .	.01 <sup>1</sup> / <sub>2</sub>	.02 <sup>1</sup> / <sub>2</sub>
Shamrock . . . . .	...	.21 <sup>1</sup> / <sub>2</sub>
Temiskaming . . . . .	.32	.32 <sup>1</sup> / <sub>4</sub>
Shamrock . . . . .	...	.21 <sup>1</sup> / <sub>2</sub>
Temiskaming . . . . .	.32	.32 <sup>1</sup> / <sub>4</sub>
Trethewey . . . . .	...	.15
Wettlaufer . . . . .	.06 <sup>1</sup> / <sub>2</sub>	.07 <sup>1</sup> / <sub>2</sub>

## Gold.

	Asked.	Bid.
Apex . . . . .	.06 <sup>1</sup> / <sub>2</sub>	.06 <sup>3</sup> / <sub>4</sub>
Dome Extension . . . . .	.16 <sup>1</sup> / <sub>2</sub>	.17
Dome Lake . . . . .	...	.17 <sup>1</sup> / <sub>2</sub>
Dome Mines . . . . .	10.10	...
Eldorado . . . . .	.02 <sup>5</sup> / <sub>8</sub>	.03
Gold Reef . . . . .	.01 <sup>1</sup> / <sub>2</sub>	.01 <sup>3</sup> / <sub>4</sub>
Hollinger . . . . .	4.53	1.55
Keora . . . . .	.16	.17 <sup>1</sup> / <sub>2</sub>
Kirkland Lake . . . . .	.43	.46
McIntyre . . . . .	1.60	1.61
Moneta . . . . .	.07 <sup>3</sup> / <sub>4</sub>	.09
Newray . . . . .	.77	.79
Porcupine Crown . . . . .	.12	.19
Porcupine Imperial . . . . .	.02 <sup>1</sup> / <sub>2</sub>	.03
Porcupine Tisdale . . . . .	.01 <sup>3</sup> / <sub>4</sub>	.02 <sup>1</sup> / <sub>2</sub>
Vipond . . . . .	.34	...
Preston . . . . .	.04 <sup>1</sup> / <sub>4</sub>	.04 <sup>1</sup> / <sub>2</sub>
Schunacher . . . . .	.48	.50
Teck Hughes . . . . .	.45	.50
Thompson-Krist . . . . .	.07	.09
West Dome . . . . .	.18 <sup>1</sup> / <sub>2</sub>	.19

## TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.  
Cobalt oxide, grey, \$1.65 per lb.  
Cobalt metal, \$2.25 per lb.  
Nickel metal, 45 to 50 cents per lb.  
White arsenic, 15 cents per lb.

Aug. 23, 1917—(Quotations from Canada Metal Co., Toronto.)

Spelter, 11<sup>1</sup>/<sub>2</sub> cents per lb.

Lead, 13 cents per lb.

Tin, 63 cents per lb.

Antimony, 18 cents per lb.

Copper, casting, 33 cents per lb.

Electrolytic, 35 cents per lb.

Ingot brass, yellow, 23 cents; red, 25<sup>1</sup>/<sub>2</sub> cents per lb.

Aug. 23, 1917—(Quotations from Elias Rogers Co., Toronto.)

Coal, anthracite, \$9.50 per ton.

Coal, bituminous, nominal, \$9.00.

## SILVER PRICES.

		New York. cents.	London pence.
Aug. 7 . . . . .		\$13 <sup>1</sup> / <sub>4</sub>	41 <sup>1</sup> / <sub>2</sub>
" 9 . . . . .		\$2 <sup>7</sup> / <sub>8</sub>	42 <sup>1</sup> / <sub>8</sub>
" 10 . . . . .		\$2 <sup>7</sup> / <sub>8</sub>	42 <sup>1</sup> / <sub>8</sub>
" 11 . . . . .		\$2 <sup>7</sup> / <sub>8</sub>	42 <sup>1</sup> / <sub>8</sub>
" 13 . . . . .		\$2 <sup>7</sup> / <sub>8</sub>	42 <sup>1</sup> / <sub>8</sub>
" 14 . . . . .		\$3 <sup>3</sup> / <sub>4</sub>	42 <sup>1</sup> / <sub>2</sub>
" 15 . . . . .		\$6 <sup>3</sup> / <sub>4</sub>	44
" 16 . . . . .		\$6 <sup>3</sup> / <sub>4</sub>	44
" 17 . . . . .		\$6 <sup>3</sup> / <sub>4</sub>	44

## NEW YORK MARKETS.

Connellsville Coke—

Furnace, spot, \$13.50 to \$15.00.

Furnace, contract, nominal.

Foundry, spot, \$14.00 to \$15.00.

Foundry, contract, nominal.

Straits Tin, spot, f.o.b., 62.62<sup>1</sup>/<sub>2</sub>.

Copper—

Prime Lake, nominal, 28.50 to 29.50.

Electrolytic, nominal, 26.75 to 27.25.

Casting, nominal, 26.00 to 26.50.

Lead Trust price, 11.00 cents.

Lead, outside, nominal, 10.62<sup>1</sup>/<sub>2</sub> to 10.87<sup>1</sup>/<sub>2</sub> cents.

Spelter, prompt western shipment, 8.55 cents.

Antimony—Chinese and Japanese, nominal, 15.12<sup>1</sup>/<sub>2</sub> to 15.37<sup>1</sup>/<sub>2</sub> cents.

Aluminum—nominal.

No. 1 Virgin 98.99 per cent., 48.00 to 50.00 cents.

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Scheelite, \$26.00.

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Seamless brass, 41.00 to 45.00.

Seamless bronze, 54.00 cents.

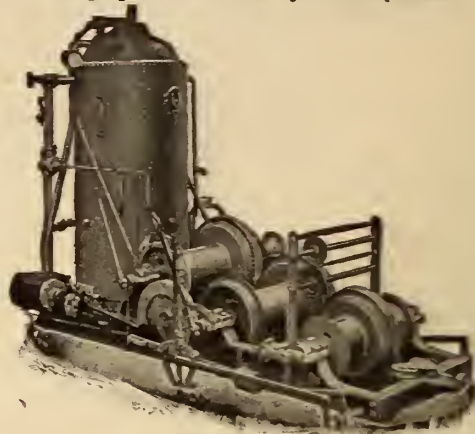
Full lead sheets, 12.75 cents.

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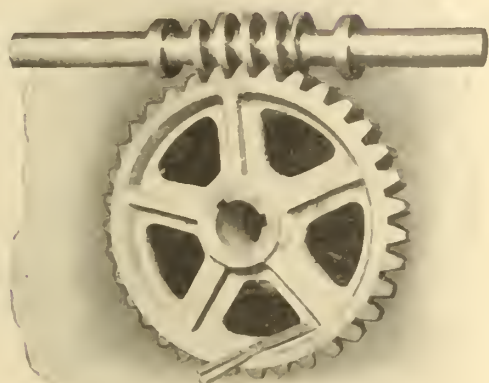
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- The Nickel Industry: with special reference to the Sudbury region, Ont. Report on, by Professor A. P. Coleman, Ph.D.
- The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.
- Building and Ornamental Stones of Canada (Western Provinces). Vol IV., by W. A. Parks, Ph.D.
- Feldspar in Canada. Report on, by H. S. de Schmid, M.E.
- Peat, Lignite and Coal: their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.
- Annual Report of Mineral Production during Calendar Year, 1915, by John McLeish, B.A.
- The Petroleum and Natural Gas Resources of Canada: Vols. I. and II., by F. G. Clapp, M.A., and others.
- The Value of Peat Fuel for the Generation of Steam. Bulletin No. 17, by John Blizard, B.Sc.
- Cobalt Alloys with Non-corrosive Properties. Report on, by H. T. Kalmus, B.Sc., Ph.D.
- Electro-thermic Smelting of Iron Ores in Sweden. Report on, by A. Stansfield, D.Sc.
- Non-metallic Minerals Used in Canadian Manufacturing Industries. Report on, by H. Frechette, M.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

**Fuel Testing Laboratory.**—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.

**Ore-Dressing Laboratory.**—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.

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**Structural Materials Laboratory.**—Experimental work on sands, cements and limes is also undertaken.

Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

### GEOLOGICAL SURVEY

#### Recent Publications

- Memoir 64. Preliminary Report on the Clay and Shale Deposits of the Province of Quebec, by J. Keele.
- Memoir 74. A List of Canadian Mineral Occurrences, by Robert A. A. Johnston.
- Memoir 77. Geology and Ore Deposits of Rossland, British Columbia, by C. W. Drysdale.
- Memoir 82. Rainy River District of Ontario. Surficial Geology and Soils, by W. A. Johnston.
- Memoir 84. An Exploration of the Tazin and Taltson Rivers, Northwest Territory, by Charles Camsell.
- Memoir 85. Road Material Surveys in 1914, by L. Reinecke.
- Memoir 87. Geology of a Portion of the Flathead Coal Area, British Columbia, by J. D. Mackenzie.
- Memoir 88. Geology of Graham Island, British Columbia, by J. D. Mackenzie.
- Memoir 89. Wood Mountain-Willowbunch Coal Area, Saskatchewan, by Bruce Rose.
- Memoir 92. Part of the District of Lake St. John, Quebec, by John A. Dresser.
- Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.
- Memoir 94. Ymir Mining Camp, British Columbia, by Charles Wales Drysdale.
- Memoir 95. Onaping Map-Area, by W. H. Collins.
- Map 59A. Wheaton, Yukon Territory.
- Map 60A. Wheaton, Yukon.
- Map 67A. Kirkfield Sheet, Victoria County, Ontario.
- Map 150A. Ponhook Lake Sheet, Nova Scotia.
- Map 175A. Ymir, Kootenay, British Columbia.
- Map 176A. Graham Island, Queen Charlotte Islands, British Columbia.
- Map 177A. Southern Portion of Graham Island, Queen Charlotte Islands, British Columbia.
- Map 180A. Espanola Area, Sudbury District, Ontario.
- Map 184A. Roberval, Lake St. John County, Quebec.
- Map 187A. Southern Plains of Alberta.

Applicants for publications not listed above should mention the precise area concerning which information is desired.

Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

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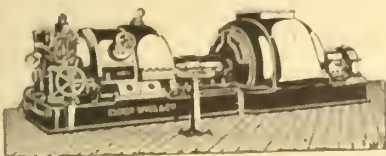
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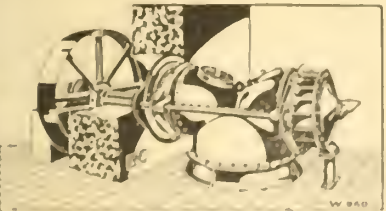
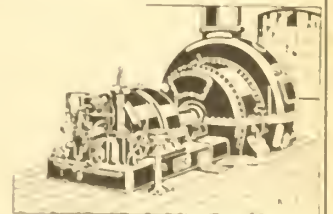
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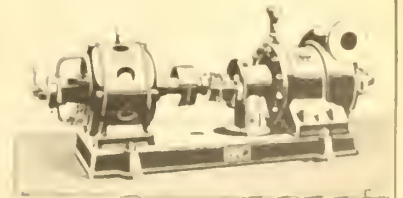
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Nickel Oxide and Metal  
Refined White Arsenic  
"STELLITE"**

**High Speed Tool Metal**

Head Office and Works : DELORO, Ont.

Branch Offices: 200 King Street West, Toronto  
315 Craig Street West, Montreal

## C. L. CONSTANT CO.,

42 New Street - New York

### SHIPPERS' AGENTS

FOR

**Selling, Sampling and Assaying Ores,  
Metals and Furnace Products**

Entire charge taken of shipments from the receipt of bill  
of lading to the collection of smelter's return

**NOT CONNECTED WITH ANY SMELTER**

Canadian Representative :

G. C. BATEMAN

Traders Bank Building, Toronto

## Balbach Smelting and Refining Co. Newark, N. J.

Buyers of

Gold, Silver, Lead and Copper Ores.  
Lead Residues and Copper Residues.

**Electrolytic Copper Refinery**

INQUIRIES SOLICITED

## The Coniagas Reduction Company, Limited.

St. Catharines, - - - Ontario

**Smelters and Refiners of Cobalt Ores**

Manufacturers of

**Bar Silver, Arsenic—White and Metallic, Cobalt  
Oxide and Metal.**

Telegraphic Address:  
"Coniagas"

Cables: Bedford McNeill,  
A.B.C. 5th Edition

Bell Telephone 603, St. Catharines





# Blasting Accessories

**E. B. Caps** Made in No. 6, No. 7 and No. 8 strengths. No. 8 being twice as strong as No. 6. We strongly recommend our strong blasting caps. They more than pay for themselves in decreasing fume and getting increased work from the explosion.

**Blasting Machines** Made to explode from 10 to 150 E.B. Caps. These batteries are made with particular care and can be absolutely depended upon to do the work.

**Connecting Wire** Our Connecting Wire is especially adapted for our E. B. Caps. Experience has proved that its capacity to carry ample current for a large number of caps makes large blasts successful.

**Leading Wire** Made single and double strand. Our single strand leading wire is made of copper wire, is well insulated and adapted for use in larger blasts. Double strand insulating wire is found convenient for use in mines or other places where wires have to be moved frequently.

WE SUPPLY ALL OTHER ACCESSORIES  
NECESSARY FOR BLASTING

## Canadian Explosives Limited

Head Office - - - MONTREAL, P.Q.

Main Western Office - VANCOUVER, B.C.

### DISTRICT OFFICES:

NOVA SCOTIA:	-	-	-	-	-	Halifax
QUEBEC:	-	-	-	-	-	Montreal
ONTARIO:	Toronto,	Cobalt,	South Porcupine	Port Arthur,	-	Ottawa
MANITOBA:	-	-	-	-	-	Winnipeg
ALBERTA:	-	-	-	-	-	Edmonton
BRITISH COLUMBIA:	Vancouver,	Victoria,	Nelson,	-	-	Prince Rupert

### Factories at

Beloeil, P.Q.	Vaudreuil, P.Q.	Windsor Mills, P.Q.
Waverley, N.S.	James Island, B.C.	Nanaimo, B.C.
Northfield, B.C.	Bowen Island, B.C.	Parry Sound, Ont.

# The Canadian Miners' Buying Directory.

**Air Hoists—**  
Canadian Ingersoll-Rand Co.  
Ltd.

**Amalgamators—**  
Fraser & Chalmers of Can-  
ada, Limited.  
Northern Canada Supply Co.

**Antimony—**  
Canada Metal Co., Ltd.

**Assayers and Chemists—**  
Milton L. Hersey Co., Ltd.  
Campbell & Deyell, Cobalt.  
Ledoux & Co., 99 John St.,  
New York.  
Thos. Heys & Son.  
C. L. Constant Co.

**Assayers' and Chemists Sup-  
plies—**  
C. L. Berger & Sons, 37 Wil-  
liam St., Boston, Mass.  
Lymans, Ltd., Montreal, Que.  
Stanley, W. F. & Co., Ltd.

**Barbitt Metals—**  
Canada Metal Co., Ltd.  
Can. Fairbanks-Morse Co.

**Ball Mills—**  
Fraser & Chalmers of Can-  
ada, Limited.  
Hull Iron & Steel Foundries,  
Ltd.

**Beltting—Leather, Rubber and  
Cotton—**  
Can. Fairbanks-Morse Co.  
Northern Canada Supply Co.  
Jones & Glassco.

**Blasting Batteries and Sup-  
plies—**  
Can. Ingersoll-Rand Co.,  
Ltd.  
Curtis & Harvey (Canada)  
Ltd.  
Northern Canada Supply Co.  
Canadian Explosives, Ltd.

**Blowers—**  
Can. Fairbanks-Morse Co.  
Fraser & Chalmers of Can-  
ada, Limited.  
Northern Canada Supply Co.

**Boilers—**  
Can. Fairbanks-Morse Co.  
Fraser & Chalmers of Can-  
ada, Limited.  
Northern Canada Supply Co.  
Can. Ingersoll-Rand Co.,  
Ltd.

**Boxes, Cable Junction—**  
Standard Underground Cable  
Co. of Canada, Ltd.

**Buckets—**  
Can. Fairbanks-Morse Co.  
Hendrick Mfg. Co.  
M. Beatty & Sons, Ltd.  
Northern Canada Supply Co.

**Cable — Aerial and Under-  
ground—**  
Fraser & Chalmers of Can-  
ada, Ltd.  
Northern Canada Supply Co.  
Standard Underground Cable  
Co. of Canada, Ltd.

**Chuleways—**  
Fraser & Chalmers of Can-  
ada, Ltd.  
M. Beatty & Sons, Ltd.

**Cages—**  
Fraser & Chalmers of Can-  
ada, Limited.  
Jeffrey Mfg. Co.  
Northern Canada Supply Co.

**Cables—Wire—**  
Standard Underground Cable  
Co. of Canada, Ltd.

**Car Dumps—**  
Sullivan Machinery Co.

**Cars—**  
Can. Fairbanks-Morse Co.  
W. Fraser.  
Jeffrey Mfg. Co.  
Northern Canada Supply Co.  
MacKinnon, Holmes & Co.

**Cement Machinery—**  
Northern Canada Supply Co.  
Hull Iron & Steel Foundries,  
Ltd.

**Chains—**  
Can. Fairbanks-Morse Co.  
Jeffrey Mfg. Co.  
Jones & Glassco.  
Northern Canada Supply Co.  
B. Greening Wire Co., Ltd.

**Chemists—**  
Canadian Laboratories.  
Campbell & Deyell.  
Thos. Heys & Sons.  
Milton Hersey Co.  
Ledoux & Co.

**Coal—**  
Dominion Coal Co.  
Nova Scotia Steel & Coal Co.

**Coal Cutters—**  
Jeffrey Mfg. Co.  
Sullivan Machinery Co.  
Can. Ingersoll-Rand Co., Ltd.

**Coal Dock Bridges—**  
Roberts & Schaefer Co.

**Coal Mining Explosives—**  
Curtis & Harvey (Can.),  
Ltd.  
Canadian Explosives, Ltd.

**Coal Mining Machinery—**  
Can. Ingersoll-Rand Co., Ltd.  
Fraser & Chalmers of Can-  
ada, Limited.  
Jeffrey Mfg. Co.  
Roberts & Schaefer Co.  
Sullivan Machinery Co.

**Coal Pick Machines—**  
Sullivan Machinery Co.  
Can. Ingersoll-Rand Co., Ltd.

**Coal Washeries—**  
Jeffrey Mfg. Co.  
Roberts & Schaefer Co.

**Coaling Stations—**  
Roberts & Schaefer Co.

**Compressors—Air—**  
Can. Fairbanks-Morse Co.  
Darling Bros., Ltd.  
Escher Wyss & Co.  
W. Fraser.  
Smart-Turner Machine Co.  
Fraser & Chalmers of Can-  
ada, Limited.  
Can. Ingersoll-Rand Co., Ltd.  
Northern Canada Supply Co.

**Concentrators and Jigs—**  
Fraser & Chalmers of Can-  
ada, Limited.

**Concrete Mixers—**  
Can. Fairbanks-Morse Co.  
Northern Canada Supply Co.  
Wettlaufer Bros.

**Condensers—**  
Fraser & Chalmers of Can-  
ada, Ltd.  
Smart-Turner Machine Co.  
Northern Canada Supply Co.

**Converters—**  
Fraser & Chalmers of Can-  
ada, Limited.  
Jeffrey Mfg. Co.  
Northern Canada Supply Co.

**Conveyer—Trough—Belt—**  
Can. Fairbanks-Morse Co.  
Jeffrey Mfg. Co.  
Hendrick Mfg. Co.

**Cranes—**  
Can. Fairbanks-Morse Co.  
Smart-Turner Machine Co.  
M. Beatty & Sons, Ltd.

**Crane Ropes—**  
Allan, Whyte & Co.  
B. Greening Wire Co., Ltd.

**Grinding Plates—**  
Hull Iron & Steel Foundries,  
Ltd.

**Crushers—**  
Can. Fairbanks-Morse Co.  
Fraser & Chalmers of Can-  
ada, Limited.  
Lymans, Ltd.  
Jeffrey Mfg. Co.  
Mussens, Limited.

**Hull Iron & Steel Foundries,  
Ltd.**

**Cyanide Plants—**  
Fraser & Chalmers of Can-  
ada, Limited.  
Roessler & Hasselacher.

**Derricks—**  
Can. Fairbanks-Morse Co.  
Smart-Turner Machine Co.  
S. Flory Mfg. Co.  
M. Beatty & Sons, Ltd.

**Diamond Drill Contractors—**  
Diamond Drill Contracting  
Co.  
Smith & Traver.  
Sullivan Machinery Co.

**Dredger Flows—**  
Armstrong, Whitworth of  
Canada, Ltd.

**Dredging Machinery—**  
M. Beatty & Sons

**Dredging Ropes—**  
Allan, Whyte & Co.  
Fraser & Chalmers of Can-  
ada, Limited.

**Drills, Air and Hammer—**  
Can. Ingersoll-Rand Co., Ltd.  
Jeffrey Mfg. Co.  
Sullivan Machinery Co.  
Northern Canada Supply Co.

**Drills—Core —**  
Can. Ingersoll-Rand Co., Ltd.  
Standard Diamond Drill Co.  
Sullivan Machinery Co.

**Drills—Diamond—**  
Sullivan Machinery Co.  
Northern Canada Supply Co.

**Drill Steel—Mining—**  
Armstrong, Whitworth of  
Can., Ltd.

**Drill Steel Sharpeners—**  
Can. Ingersoll-Rand Co., Ltd.  
Northern Canada Supply Co.  
Sullivan Machinery Co.

**Drills—Electric—**  
Can. Ingersoll-Rand Co., Ltd.  
Sullivan Machinery Co.

**Drills—High Speed and Car-  
bon—**  
Armstrong Whitworth of  
Can., Ltd.  
Can. Fairbanks-Morse Co.

**Dynamite—**  
Curtis & Harvey (Canada),  
Ltd.  
Canadian Explosives.  
Northern Canada Supply Co.

**Ejectors—**  
Can. Fairbanks-Morse Co.  
Darling Bros., Ltd.  
Can. Ingersoll-Rand Co., Ltd.  
Northern Canada Supply Co.

**Elevators—**  
Darling Bros., Ltd.  
Jeffrey Mfg. Co.  
M. Beatty & Sons.  
Sullivan Machinery Co.  
Northern Canada Supply Co.  
Wettlaufer Bros.

**Engineering Instruments—**  
C. L. Berger & Sons.  
**Engineers and Contractors—**  
Fraser & Chalmers of Can-  
ada, Limited.  
Roberts & Schaefer Co.  
Foundation Co., Ltd., of  
Montreal.

**Engines—Automotive—**  
Can. Fairbanks-Morse Co.  
Smart-Turner Machine Co.

**Engines—Gas and Gasoline—**  
Can. Fairbanks-Morse Co.  
Fraser & Chalmers of Can-  
ada, Limited.

**Alex. Fleck.**

**Sullivan Machinery Co.**  
**Smart-Turner Machine Co.**  
**Engines—Haulage—**  
Can. Fairbanks-Morse Co.  
Fraser & Chalmers of Can-  
ada, Limited.  
Can. Ingersoll-Rand Co., Ltd.

**Engines—Marine—**  
Can. Fairbanks-Morse Co.  
Smart-Turner Machine Co.

**Engines—Steam—**  
Fraser & Chalmers of Can-  
ada, Limited.  
Smart-Turner Machine Co.  
M. Beatty & Sons.

**Fans—Ventilating—**  
Can. Fairbanks-Morse Co.  
Fraser & Chalmers of Can-  
ada, Limited.  
Jeffrey Mfg. Co.

**Feeders—Ore—**  
Fraser & Chalmers of Can-  
ada, Limited.

**Floation Oils—**  
Georgia Pine Turpentine Co.  
of New York

**Forges—**  
Can. Fairbanks-Morse Co.  
Northern Canada Supply Co.  
Ltd.

**Forging—**  
M. Beatty & Sons.  
Smart-Turner Machine Co.

**Furnaces—Assay—**  
Lymans, Ltd.

**Fuse—**  
Curtis & Harvey (Canada),  
Ltd.

**Canadian Explosives**  
**Northern Canada Supply Co**  
**Gears—**  
Can. Fairbanks-Morse Co.  
Smart-Turner Machine Co.  
Northern Canada Supply Co.

**Hull Iron & Steel Foundries,  
Ltd.**

**Hammer Rock Drills—**  
Mussens, Limited.

**Hangers—Cable—**  
Standard Underground Cable  
Co. of Canada, Ltd.

**Hand Hoists—**  
Darling Bros., Ltd.  
Fraser & Chalmers of Can-  
ada, Limited.

**High Speed Steel—**  
Armstrong, Whitworth of  
Canada, Limited.

**High Speed Steel Twist Drills—**  
Northern Canada Supply Co.  
Armstrong, Whitworth of  
Canada, Ltd.

**Hoists—Air, Electric and  
Steam—**  
Can. Fairbanks-Morse Co.  
Can. Ingersoll-Rand Co., Ltd.  
Jones & Glassco.  
M. Beatty & Sons.  
Fraser & Chalmers of Can-  
ada, Limited.  
Northern Canada Supply Co.  
Wettlaufer Bros.

**Hoisting Engines—**  
Can. Fairbanks-Morse Co.  
Mussens, Limited.  
Sullivan Machinery Co.  
Fraser & Chalmers of Can-  
ada, Limited.  
Can. Ingersoll-Rand Co., Ltd.  
M. Beatty & Sons.

**Hose—**  
Can. Fairbanks-Morse Co.  
Northern Canada Supply Co.

**Ingot Copper—**  
Canada Metal Co., Ltd.

**Insulating Compounds—**  
Standard Underground Cable  
Co. of Canada, Ltd.

**Jacks—**  
Can. Fairbanks-Morse Co.  
Can. Ingersoll-Rand Co., Ltd.  
Northern Canada Supply Co.

**Kila Linings—**  
Hull Iron & Steel Foundries,  
Ltd.

**Kommuters—**  
Hull Iron & Steel Foundries,  
Ltd.

**Lamps—Carbon—**  
J. S. Aspinall.

**Lamps—Electric—**  
J. S. Aspinall.

**Lamps—Safety—**  
Canadian Explosives.

**Lamps—Tungsten—**  
J. S. Aspinall.

**Link Belt—**  
Can. Fairbanks-Morse Co.  
Northern Canada Supply Co.  
Jones & Glassco.

**Locomotives—**  
W. Fraser.

**Machinists and Founders—**  
Hull Iron and Steel Found-  
ries, Ltd.

**Metal Merchants—**  
Henry Bath & Son.  
Geo. G. Blackwell, Sons &  
Co.  
Consolidated Mining and  
Smelting Co. of Canada.  
Canada Metal Co.  
C. L. Constant Co.

**Monel Metal—**  
International Nickel Co.

**Nickel—**  
International Nickel Co.

**Ore Sacks—**  
Northern Canada Supply Co.

**Ore Testing Works—**  
Ledoux & Co.

**Can Laboratories**  
**Milton Hersey Co., Ltd**  
**Campbell & Deyell**

**Ores and Metals—Buyers and  
Sellers of**

**C. L. Constant Co**  
**Geo. G. Blackwell**  
**Consolidated Mining and**  
**Smelting Co. of Canada**  
**Orford Copper Co**  
**Canada Metal Co**

**Perforated Metals—**  
B. Greening Wire Co., Ltd.

**Fraser & Chalmers of Can-  
ada, Limited**  
**Northern Canada Supply Co**  
**Hendrick Mfg Co**



## Canadian Miners' Buying Directory.—(Continued from page 19.)

<b>Pig Tin—</b> Canada Metal Co., Ltd.	<b>Can. Ingersoll-Rand Co., Ltd.</b> Fraser & Chalmers of Canada Limited.	<b>Rope—Manilla and Jute—</b> Jones & Glassco. Northern Canada Supply Co. Allan, Whyte & Co.	<b>Stamp Mills—</b> Fraser & Chalmers of Canada, Limited.
<b>Pig Lead—</b> Canada Metal Co., Ltd.	<b>Pumps—Electric—</b> Can. Fairbanks-Morse Co. Darling Bros., Ltd. Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd. Fraser & Chalmers of Canada, Limited.	<b>Rope—Wire—</b> B. Greening Wire Co., Ltd. Allan, Whyte & Co. Northern Canada Supply Co. Fraser & Chalmers of Canada, Limited.	<b>Steel Barrels—</b> Smart-Turner Machine Co.
<b>Pipes—</b> Can. Fairbanks-Morse Co. Canada Metal Co., Ltd. Consolidated M. & S. Co. Pacific Coast Pipe Co., Ltd. Northern Canada Supply Co. Smart-Turner Machine Co.	<b>Pumps—Pneumatic—</b> Can. Fairbanks-Morse Co. Darling Bros., Ltd. Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd. Sullivan Machinery Co.	<b>Samplers—</b> C. L. Constant Co. Ledoux & Co. Milton Hersey Co. Thos. Heys & Son.	<b>Steel Drills—</b> Sullivan Machinery Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd.
<b>Pipe Fittings—</b> Can. Fairbanks-Morse Co. Northern Canada Supply Co.	<b>Pumps—Steam—</b> Can. Fairbanks-Morse Co. Can. Ingersoll-Rand Co., Ltd. Darling Bros., Ltd. Mussens, Limited. Northern Canada Supply Co.	<b>Scales—</b> Can. Fairbanks-Morse Co.	<b>Steel Drums—</b> Smart-Turner Machine Co.
<b>Piston Rock Drills—</b> Mussens, Limited.	<b>Pumps—Turbine—</b> Can. Fairbanks-Morse Co. Darling Bros., Ltd. Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd. Fraser & Chalmers of Canada, Limited.	<b>Screeners—</b> B. Greening Wire Co., Ltd. Jeffrey Mfg. Co. Northern Canada Supply Co. Fraser & Chalmers of Canada, Limited. Roberts & Schaefer Co. Hendrick Mfg. Co.	<b>Steel—Tool—</b> N. S. Steel & Coal Co. Armstrong, Whitworth of Can., Ltd.
<b>Pneumatic Tools—</b> Can. Ingersoll-Rand Co., Ltd. Jones & Glassco.	<b>Quarrying Machinery—</b> Sullivan Machinery Co. Can. Ingersoll-Rand Co., Ltd.	<b>Screeners—Cross Patent Flanged Lip—</b> Hendrick Mfg. Co.	<b>Surveying Instruments—</b> W. F. Stanley. C. L. Berger.
<b>Prospecting Mills and Machinery—</b> Standard Diamond Drill Co. Fraser & Chalmers of Canada, Limited.	<b>Rails—</b> W. Fraser.	<b>Separators—</b> Can. Fairbanks-Morse Co. Darling Bros., Ltd. Smart-Turner Machine Co.	<b>Tanks—Cyanide, Etc.—</b> Fraser & Chalmers of Canada, Limited. Hendrick Mfg. Co. Pacific Coast Pipe Co., Ltd. MacKinnon, Holmes & Co.
<b>Pulleys, Shafting and Hangings—</b> Can. Fairbanks-Morse Co. Fraser & Chalmers of Canada, Limited. Jeffrey Mfg. Co. Northern Canada Supply Co.	<b>Roasting Plants—</b> Fraser & Chalmers of Canada, Limited.	<b>Sheet Lead—</b> Canada Metal Co., Ltd.	<b>Tipplers—</b> Roberts & Schaefer Co.
<b>Pumps—Boiler Feed—</b> Can. Fairbanks-Morse Co. Darling Bros., Ltd. Smart-Turner Machine Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd. Fraser & Chalmers of Canada, Limited. Wettlaufer Bros.	<b>Rolls—Crushing—</b> Fraser & Chalmers of Canada, Limited.	<b>Sheets—Genuine Manganese Bronze—</b> Hendrick Mfg. Co.	<b>Transits—</b> C. L. Berger & Sons.
<b>Pumps—Centrifugal—</b> Can. Fairbanks-Morse Co. Darling Bros., Ltd. Escher Wyss & Co. Mussens, Limited. Smart-Turner Machine Co. M. Beatty & Sons.	<b>Roofing—</b> Can. Fairbanks-Morse Co. Northern Canada Supply Co.	<b>Shovels—Steam—</b> M. Beatty & Sons. W. Fraser.	<b>Tube Mills—</b> Fraser & Chalmers of Canada, Limited.

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# Ontario's Mining Lands

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Ontario, with its 407,262 square miles of area, contains many millions of acres in which the geological formations are favourable for the occurrence of minerals, 70 per cent. of the rocks being of pre-Cambrian age.

The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Helen, Magpie and Moose Mountain mines.

Many other varieties of useful products are found in Ontario: cobalt, iron pyrites, arsenic, quartz, graphite, talc, feldspar, mica, corundum, molybdenite, platinum, palladium, actinolite, apatite, fluorite, salt, gypsum, petroleum and natural gas.

Building materials, such as cement, brick, marble, limestone, sandstone, trap, lime, sand and gravel, are abundant.

Ontario in 1915 produced over 44 per cent. of the total mineral production of Canada, or more than twice that from any other Province. The preliminary report of the Ontario Bureau of Mines shows the output of the mines and metallurgical works of Ontario for the year 1915 to be worth \$57,532,844, of which the metallic production was \$47,721,180. There were 79 producing mines, 62 of which operated at a profit.

The prospector can go almost anywhere in the mineral regions in his canoe; the climate is invigorating and healthy, and there is plenty of wood and good water.

A miner's license costs \$5.00 per annum and entitles the holder to stake out in any or every mining division three claims of 40 acres each.

For list of publications, illustrated reports, geological maps and mining laws, apply to

**HON. G. H. FERGUSON,**

Minister of Lands, Forests and Mines.

**Toronto, Canada.**



# HULL IRON & STEEL FOUNDRIES LIMITED

Head Office and Works

HULL, P.Q.

Steel, Manganese, Chrome and  
Nickel Steel Castings



MACHINE MOULDED GEARS UP TO 18 FEET IN DIAMETER  
WITHOUT THE USE OF PATTERNS. WE SIMPLY REQUIRE  
THE DIMENSIONS.

Lining Plates for Hardinge Mills, Krupp  
Mills, Smidth Kominuters and all other makes  
of Ball and Tube Mills. Our Chrome-Nickel  
Lining Plates give longer service than any  
plates made in the United States or Europe.  
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# CANADIAN MINING JOURNAL

VOL. XXXVIII

TORONTO

No. 18

## TIME

is the essence of the contract. Everything depends on the use you make of the working time your men deliver—yes, but the first essential is to be sure you get the time you are paying for.

642 1202 1248 605  
 659 1204 1236 606  
 702 1201 1248 604  
 648 1200 1244 607  
 646 1203 104 603  
 655 1201 1249 601  
 659 1205 1246 601  
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 658 1209 1257 600  
 656 1201 1258 604  
 655 1202 1259 606  
 654 1212 1259 601  
 654 1206 1257 604  
 700 1200 115 555

A reduced facsimile of part of a Daily Record. Red indicates "Intes" or "early leavers."

If you use a human time keeper and a time book you must expect "human" results. If you use an International Time Recorder you employ a cold-blooded, deadly accurate machine that has no brains so it cannot "think" and cannot make mistakes. Every employee makes his own time record so he knows it must be right.

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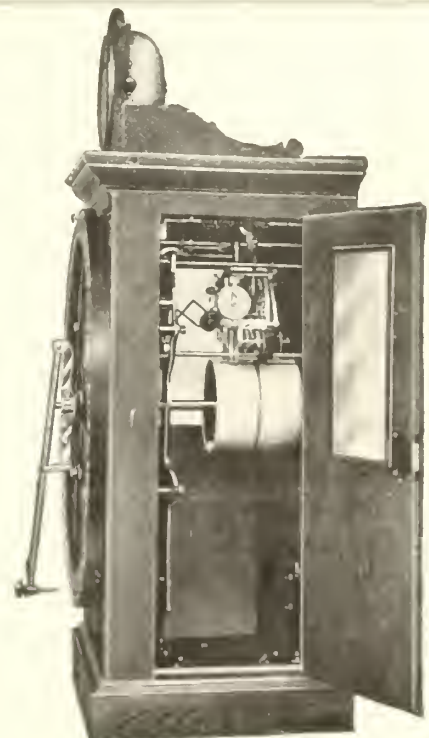
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Inside view of a Double Drum Dial Recorder.

The Time Recorder found to be most suitable to mine operations is the International Dial Recorder as shown above. It is very simple and any man who can read his number can use it. The Daily Time Record is preferable for daily distribution of labor costs, especially where labor fluctuates and shifts about a lot, as it does for mine work.







# HERE'S THE POINT

**T**HE BEST DRILLS and the most costly drill steel won't raise your tonnage or lower your costs as they should if your drill bits are not right.

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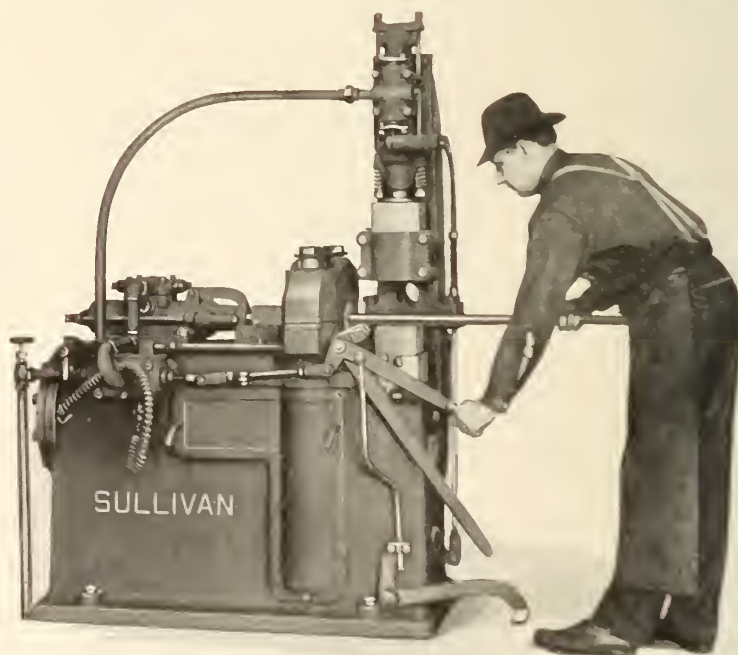
In the Sullivan Sharpener, horizontal and vertical hammers alternately and gradually upset and swage the steel at a safe heat, until the perfectly shaped bit is formed, with its grain refined, and its particles closely and uniformly hammered together. The result appears in increased cutting speed and in reduced wear and breakage of both steel and drills.

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Ask for Bulletin No. 672

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**HAMMER  
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DRILL BITS**



This picture shows the Sullivan Sharpener putting the spread or flare on the steel by upsetting it with rapid blows of a horizontal hammer. The steel is gripped in dies by a powerful compressed air vice.

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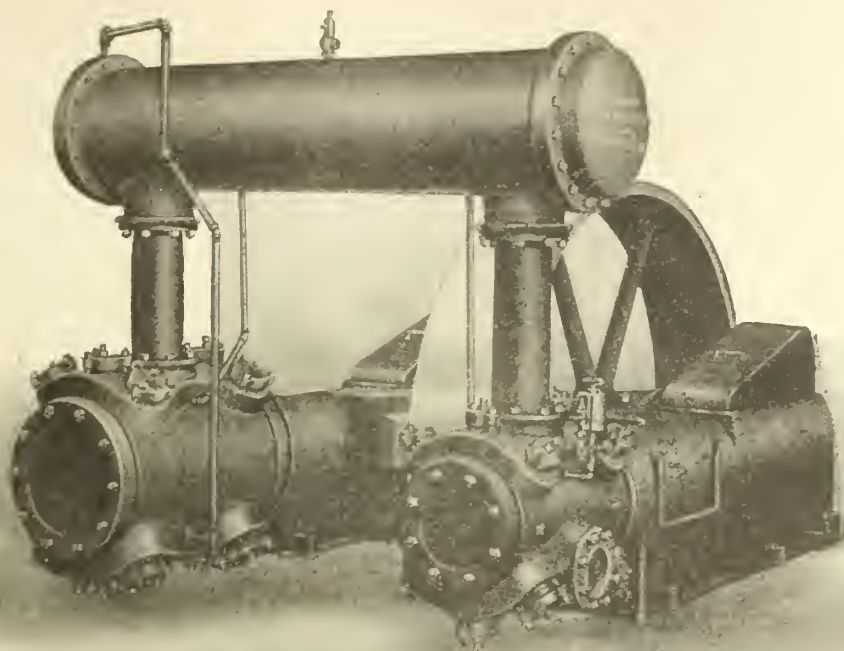
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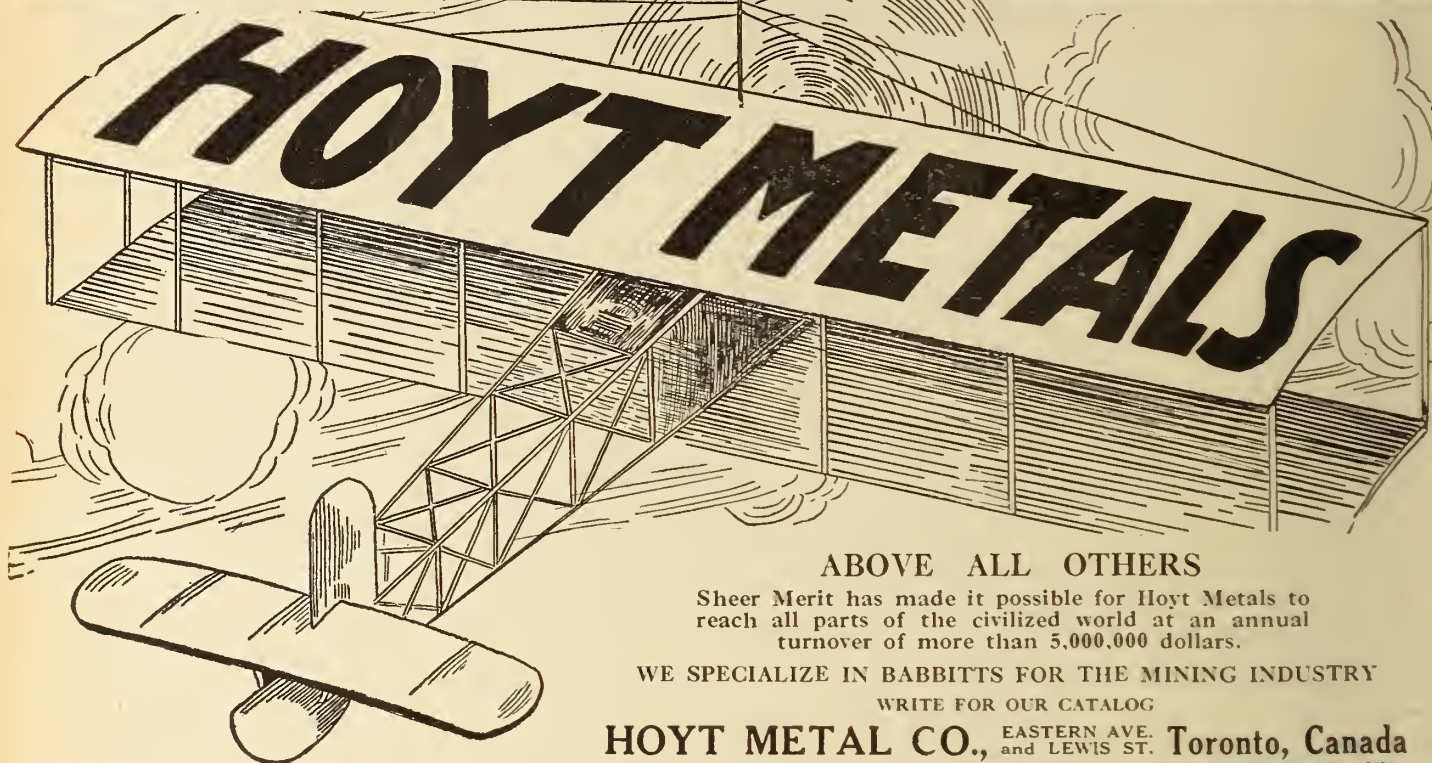
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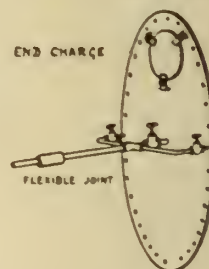
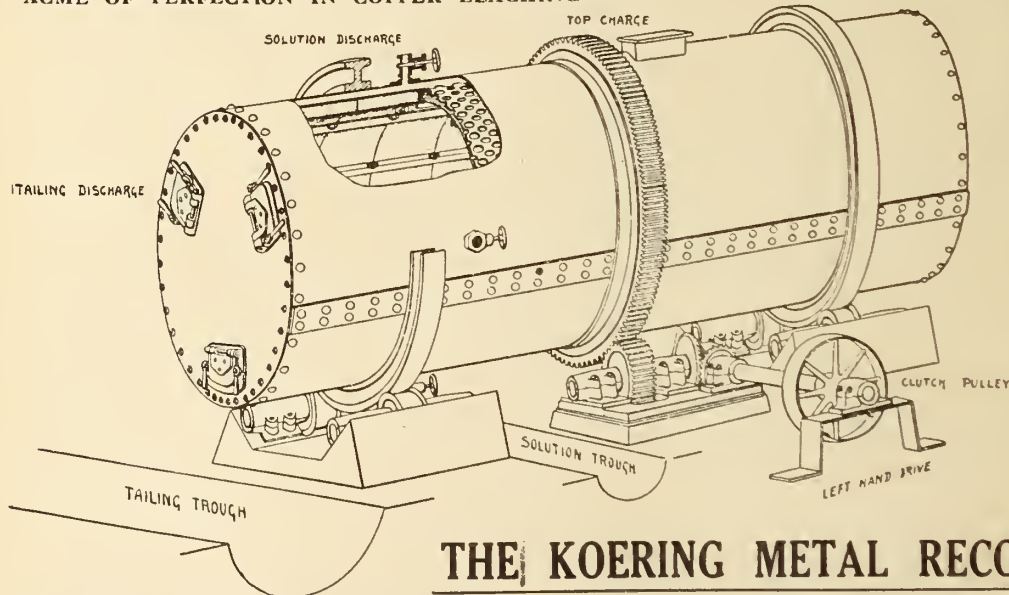
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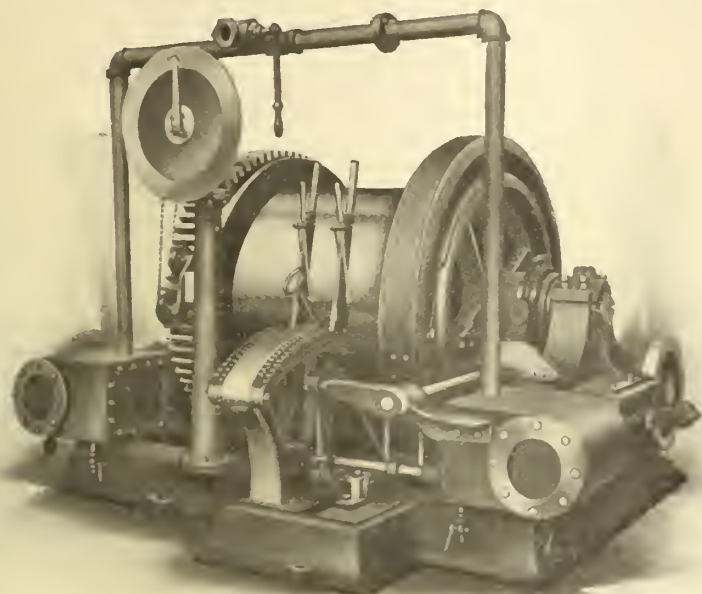
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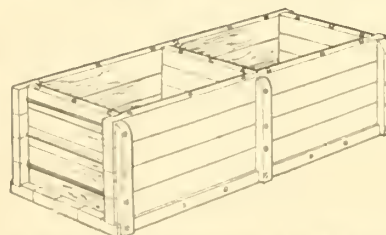
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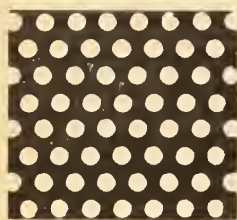
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The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1894, inclusive, \$88,904,199; for five years, 1894-1899, \$46,906,258; for five years, 1899-1904, \$90,391,394; for five years 1904-1909, \$121,618,733; for five years, 1909-1914, \$139,002,161, for the year 1915 \$29,447,508.

## Production During last ten years, \$267,607,077

Lode-mining has only been in progress for about twenty years, and not 20 per cent. of the Province has been even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

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Nova Scotia possesses extensive areas of mineral lands and offers a great field for those desirous of investment.

**Coal** Over six million tons of coal were produced in the province during 1916, making Nova Scotia by far the leader among the coal producing provinces of the Dominion.

**Iron** The province contains numerous districts in which occur various varieties of iron ore, practically at tide water and in touch with vast bodies of fluxes. Deposits of particularly high grade manganese ore occur at a number of different locations.

**Gold** Marked development has taken place in this industry the past several years. The gold fields of the province cover an area approximately 3,500 square miles. The gold is free milling and is from 870 to 970 fine.

**Gypsum** Enormous beds of gypsum of a very pure quality and frequently 100 feet thickness, are situated at the water's edge.

High grade cement making materials have been discovered in favorable situations for shipping.

Government core-drills can be had from the department for boring operations.

The available streams of Nova Scotia can supply at least 500,000 h.p. for industrial purposes.

Prospecting and Mining Rights are granted direct from the Crown on very favorable terms.

Copies of the Mining Law, Mines Reports, Maps and Other Literature may be had free on application to

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*Commissioner of Public Works and Mines*



## PROVINCE OF QUEBEC

MINES BRANCH

Department of Colonization, Mines and Fisheries

*The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, etc.*

The Mining Law gives absolute security of Title and is very favourable to the Prospector.

**MINERS' CERTIFICATES.** First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

**WORKING CONDITIONS.** During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

**SIX MONTHS AFTER STAKING.** At the expiration of six months from date of the staking, the prospector, to retain his rights, must take out a mining license.

**MINING LICENSE.** The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

**MINING CONCESSION.** Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

**PROVINCIAL LABORATORY.** Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, MONTREAL, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

**HONOURABLE HONORÉ MERCIER,**

MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC.

# The Flotation Process

All patent and other rights to this process  
in North America are now controlled by

## Minerals Separation North American Corporation

who is the registered owner of the following Canadian patents: Nos. 76,621; 87,700; 94,332; 94,516; 94,718; 96,182; 96,183; 99,743; 127,397; 129,819; 129,820; 134,271; 135,089; 137,404; 142,607; 147,431; 147,432; 148,275; 151,479; 151,480; 151,619; 151,810; 157,488; 157,603; 157,604; 160,692; 160,693; 160,694; 160,846; 160,847; 160,848; 160,849; 160,850; 160,937; 163,587; 163,608; 163,707; 163,936; 165,390; 166,415; 167,474; 167,475; 167,476; 167,603.

On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

## NOTICE

Notice is hereby given that we will enforce our patents and stop all infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

Notice is further given that no one is authorized to introduce our processes or apparatus into the United States, Canada or Mexico.

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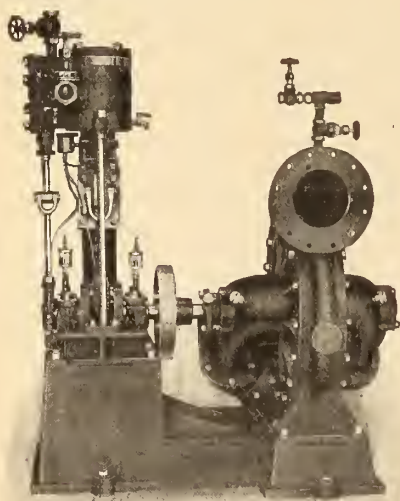
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It can be diffused over large areas or projected in a solid beam.

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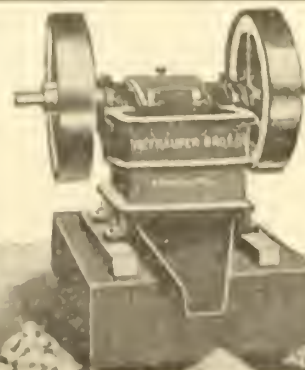


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# THE CANADIAN MINING JOURNAL

VOL. XXXVIII.

TORONTO, September 15th, 1917.

No. 18

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## ONTARIO'S METAL MINING INDUSTRY.

Northern Ontario mining districts are constantly giving evidence of the wonderful wealth that is stored up in the hinterland. From time to time new discoveries are made and the interest aroused becomes keener. On many occasions it has been our pleasure to tell in these pages of new developments that ensure the future of mining in Ontario. At no time has the outlook been so bright as now. We are devoting this number of the Journal largely to Northern Ontario mining in order to call special attention to conditions in the Province's chief metal producing districts.

There have been occasions during the past few years when we have had to record great activity at Sudbury nickel-copper mines, Poreupine and Kirkland Lake gold mines or Cobalt silver mines, but never were all in such good condition at the same time. In the early days of the war, when the bottom fell out of the metal markets and pessimism prevailed in industrial districts, we were able to point with satisfaction to the steady operation of the big mines at Poreupine, for whose product there was of course always a market at the old price. Increase in cost of supplies and shortage of labor held back the gold mining companies in 1916 and no startling production record was made; but even under adverse conditions the gold mining industry was being placed on a firmer footing by improved physical condition of several mines. Now that the labor crisis has been passed, sooner than was expected, we may properly expect greater activity in the gold districts than has yet been witnessed.

In the first days of the war the need for increased production of nickel and copper was not recognized and we have to look back at the strange spectacle of decrease in production as the first result of the war on this basic industry. Experience gained as the war has gone on has shown clearly that there should never have been decrease in output; but that, on the contrary, every effort should have been made to increase production. The mistake was made however; the market for the metals having temporarily disappeared, employees were dismissed and the output kept low. The error was not peculiar to companies operating in Ontario, for copper producers throughout North America cut their output in half. The conditions at Sudbury during the first few months of the war were distressing, for men were being thrown out of employment at a time when their services would have been of great value if the need for munitions had been recognized. Gradually, after much valuable time had been lost, the market improved, accumulated stocks were sold and production was increased. Then began



the race between demand and supply in which the latter has never caught up. During 1915 the Sudbury mines got back to normal production and then began to make new records. Then labor, which had not been fully utilized during the first few months of the war, became scarce and output was restricted to some extent. Recently the labor supply has improved and we may look forward to further increase in activity in the Sudbury district. At present production is being maintained at a maximum by the two operating companies and the third big company, which has been doing preliminary work with a few hundred men, will soon begin the construction of a smelter and refinery. This company, the British America, can use large numbers of men as they become available. At Port Colborne the construction of the enormous refining plant of the International nickel company is progressing rapidly. The nickel-copper industry can absorb many men and will in the future be even a greater industrial factor in the Province than it is to-day.

Recently we have been recording the improved position of companies producing silver. The steady rise in price of this metal is of great importance to the Cobalt district and may well result in numerous idle properties being opened up as well as in utilization of much ore in producing mines that was hitherto regarded as too low grade to warrant mining.

Aside from the new possibilities there is the tremendous increase in profit on the regular production. Silver is to-day selling at 30 cents above the average of 1916 and 36 cents above that of 1915. The cost of production is somewhat higher; but increased cost can be easily taken care of when such prices are obtainable. Cobalt silver mines produced over 10,000,000 ounces silver during the first six months of this year and should easily produce as much during the balance of the year, if labor and supplies are available. What the great increase in selling price means to operators may be appreciated by assuming 90 cents as the average for the second half of the year. The average for the first six months was about 75 cents. The difference in selling price would be \$3,000,000.

In the early months of the war silver was selling around 50 cents. The average for 1915 was 49.69 cents. To-day silver is selling at just about double the 1915 price. That there is an enormous increase in profits is obvious. Each one cent increase in the selling price of silver means \$200,000 increase in the receipts of silver mining companies for the year 1917. If the average should be, as it may prove to be, 20 cents higher than that of 1916 the increase in receipts would be about \$4,000,000. An interesting feature of the present condition of the silver market is that it may easily result in Cobalt's production of 20,000,000 ounces in 1917 bringing a greater return than the 31,507,791 ounces produced in 1911—Cobalt's banner production year. The production in 1912 was 30,243,859 ounces; but, the price being higher than in the

previous year, the record for value of output was made in 1912, the amount being \$17,408,935. It will not be surprising if this figure is reached again this year.

The increase in price of silver means much more to Ontario than increased profit on a certain production. It means that a large tonnage of low grade ore that might never have been used can now be worked at a profit. Fortunately, excellent progress has been made in treating Cobalt ores carrying only a few ounces of silver and the experience gained will now be turned to good account. A new incentive has been given to prospecting, both surface and underground, for silver properties must now be examined in a new light.

The situation in the nickel-copper, gold and silver districts is therefore such as to assure great activity. There is ore in abundance at Sudbury and Porcupine and even though some of the Cobalt silver mines are worked out many millions of ounces of silver are now available and more will undoubtedly be found. There is a good market for all products. Given labor and supplies the mines will make an excellent showing. It is to be hoped that Canadian manufacturers who have been devoting their attention to munitions will not be slow to realize the growing market that the Canadian mining industry offers them. The men thrown out of employment at the munitions plants will do well to consider that the mining industry offers them steady work in war or peace, in good times and bad, for mining, like farming, is a basic industry.

#### THOSE ADVISORY COUNCILS.

In defending in the House of Commons on Sept. 3 the proposals of the Advisory Council of Industrial and Scientific Research Sir George Foster said in part:

"This Bureau of Industrial and Scientific Research is formed upon the same plan as the Advisory Council in Great Britain. At present the Advisory Council has connected with it the best talent and the best advisory committees in all these different lines of scientific and practical business and industrial knowledge that Great Britain can afford. The British Government have put behind that council £1,000,000 for expenditures along lines tending in this very same direction."

We fear that Sir George is very much mistaken as to the character of the work being done by the Advisory Council in Great Britain and we are not delighted, and yet not surprised, at the statement that the Canadian Bureau is formed upon the same plan as that in Great Britain.

In our last number we called attention to the bummer being published by the Advisory Council in London. We hope that Sir George does not propose to publish more such stuff in this country. Unfortunately the Department of Trade and Commerce does not seem overly particular about its publications and its recent foolish article on potash production and its fictitious reports on the value of nickel matte exported, do not



lead us to hope that the Council will publish reliable information about Canada's mineral resources. The establishment of a Bureau of Industrial and Scientific Research in Canada was undoubtedly due to the fact that it was the fad of the times. "They have one in England, you know, and really we ought to have one here," seems to have been the argument that carried the Government. If the real need of such a Bureau had been recognized, a properly qualified board would have been selected and we would have no occasion to fear that the Canadian Bureau would ape that of London.

The Canadian Advisory Council has the power to do a great deal of good in this country. Some of its members know enough about industrial research to warrant them giving advice on certain subjects. A large number of properly qualified men, many of them nominated by technical societies, have been asked to assist the Council and these men are endeavoring to make the work of the Council a success.

Their efforts will be negated if care is not taken to curb those who are making careless statements about research and resources in the House and throughout the country. Some idea of the degree of intelligence which characterized the debate on Sept. 3 is given by the following nonsense from the speech of one member: "If the money that is being expended here should result in the discovery of some process by which the nitrogen contained in the air or feldspar could be made available as a fertilizer, it would do more for this country than ten times or a hundred times the money contained in this vote." Another equally well informed member remarked that "there are many questions of practical interest which people would like to have investigated \* \* \* the production of nitrogen from feldspar is a very important matter, and the problem in connection with that has been very largely solved, but it might be taken hold of in a practical way." The Minister, replying to the member responsible for the above absurdity said that "one of the objects of the board's work will be to find out the problems that are troubling the industrial and productive interests of the country." One of the problems will be found to be that of giving some members of the House an elementary training in science in order that they may show some signs of knowing what they are talking about. Another is the prevention of the dissemination of false information by government departments, through incompetence or carelessness.

### FOOLING THE PUBLIC.

There have been recently appearing in various publications here and in England, statements concerning wonderful new discoveries of minerals in Canada, notably of manganese and nickel. The persistency of these reports makes it appear that an organized effort

is being made to mislead someone and that Government publications are being utilized for the purpose.

In a previous number we called attention to the publication without comment in the Bulletin of the Department of Trade and Commerce of extravagant claims for a process of recovering potash from feldspar. The article was misleading enough when published in an unofficial organ; but doubly misleading when given official recognition.

In the daily press, and recently in the Bulletin of the High Commissioner for Canada, there has been published the following misinformation:

"Inexhaustible deposits of manganese dioxide which is extremely valuable as an iron toughening material and in great demand for war munition purposes have been found in Cypress Hills, Alberta. Eight hundred thousand tons worth approximately fifty four million four hundred thousand dollars have been blocked out." As a matter of fact the ore deposit is a low grade one and instead of 800,000 tons "blocked out" about 8,000 tons was indicated by surface work.

Another fairy tale that has been given wide circulation is that enormous deposits of nickel have been found at Fond du Lac, Saskatchewan. We would suggest that the Department of the Interior investigate the origin and purpose of this yarn. Perhaps the Department will discover the inventor of some of the news items being sent to England for publication in "Canada."

### GOOD RESULTS POSSIBLE.

Those who read the above paragraphs and who are familiar with our earlier remarks on the same subjects may conclude that we have little hope that the Advisory Councils and Bureaus of Scientific and Industrial Research will do the mining industry any good. We are not so pessimistic as that. We still hope that they may do even more good than they have harm; and our criticism is offered with the intention of lessening the amount of harm being done, and to direct attention to the fact that no one is more in need of advice concerning the mining industry than are these Advisory Councils. This need for advice is, we believe, already recognized by the Councils, and a large number of technical men have volunteered their services to do work for the Councils which may reasonably be expected to have important results.

If these volunteers take hold and clear up the mess they will deserve our thanks. If they go further and develop an organization such as is needed by our industries, it may yet prove that the adoption of a popular fad had good results. We are convinced that these gentlemen will not be content to ape the actions of men in other countries and we hope that they will not allow disgust for Ottawa methods to prevent them from taking a keen interest in the operation of the Bureau.



## CORRESPONDENCE.

### CONCENTRATION OF MOLYBDENITE ORES.

To the editor of the Canadian Mining Journal:

Sir,—In an article on the treatment of molybdenum ores published in the "Canadian Chemical Journal" Mr. Geo. Mackenzie states that the modern oil flotation process was tried out laboriously and with great detail, and that this process (it should be called processes) was passed up for the water film flotation process. He states further that a Wood machine, with certain weaknesses rectified, was chosen as being best fitted for the work. Mr. Mackenzie claims that this machine works satisfactorily under almost all conditions.

It is not well that such statements should remain unchallenged at this time when a new industry is opening up and needs every possible encouragement. The Wood machine or indeed the water film flotation process has proved absolutely unreliable economically wherever used for molybdenite concentrating in Canada, and this process has been discontinued wherever used.

The Mines Branch could not have spent much time in experimenting with the oil flotation process, or maybe they knew nothing of the application of the process, or they would never have tried the Wood machine.

This letter so far would appear discouraging to anyone intending to mill molybdenite ores. However the situation with regard to concentrating molybdenite ore has been greatly simplified in the last few months by the operations of the Dominion Molybdenite Company at Quyon, Quebec, using Callow cells.

The results have been so successful that the mining of molybdenite is a far harder problem to-day than the milling. Perhaps other oil flotation processes will prove successful; but in any case the results with the Callow cells are excellent.

### FLOTATION ROYALTIES.

Boston, Sept. 6.—While much has been published concerning the court struggles of the Minerals Separation Co. in its effort to validate its patents covering the so-called flotation process of treating copper and zinc ores, little has appeared in print concerning the actual operating royalties involved when final settlement is had of all disputed issues.

In this connection it may be informing to state that under the terms of an agreement entered into in 1915 between the Anaconda and Inspiration companies on the one hand, and the Minerals Separation Co. on the other, the two mining companies referred to are now paying royalties of but four cents per ton on their ores handled by flotation. It was provided that if desired the Greene-Cananea, Arizona Copper and Calumet & Arizona companies might also be included in this special agreement. The arrangement provides that the licensees shall pay upon tonnages treated by flotation upon the following basis:

	Per ton
Up to 4000 tons per day .....	12 cents
From 4000 to 6000 tons .....	10 cents
From 6000 to 10,000 tons .....	9 cents
From 10,000 to 30,000 tons .....	8 cents
Exceeding 30,000 tons .....	4 cents

### EARLY DESCRIPTIONS OF COBALT SILVER DEPOSITS.

The four veins which had been discovered when Dr. W. G. Miller first visited the camp in November 1903 were the La Rose, McKinley-Darragh, Cobalt Hill (Nipissing) and Little Silver (Nipissing). The early descriptions of the appearance of these veins are very interesting. Dr. Miller said, in part, in his first report on the Cobalt district:

#### The La Rose Vein.

"The La Rose vein lies east of the railway track, at the edge of a swamp, about one-quarter mile north of Long (Cobalt) lake. The surface of the rock is low here and little is exposed. At the widest opening the deposit has a width of over 6 ft.; but the vein matter is mixed with rock. The ore consists of niccolite (arsenide of nickel) and smaltite (arsenide of cobalt) with much silver. On weathered surfaces the vein matter is coated with the beautiful decomposition product, cobalt bloom. The green nickel stain is also seen on some surfaces, but is masked by that of the cobalt. The native silver occurs as films or leaves and fine threads, or moss-like forms, through the nickel and cobalt minerals, as well as in cracks in the rock and in the calcite veinstone. In weathered portions of the ore the silver shows distinctly. Some lumps of weathered ore weighing from 10 to 50 lbs. carry a high percentage of silver. One sheet composed chiefly of silver and attached to the rock surface had a thickness of nearly 3-8 in and a diameter of about 1 ft.

#### The Cobalt Hill Vein.

"The Cobalt Hill deposit is distinctly vein-like in form. The ore here is a mixture of smaltite and closely related arsenides. The orebody carries no silver in the parts so far uncovered. The massive ore has a width of 14 in. Vugs in the wall rock 2 ft. or more from the vein are filled with cobalt bloom.

#### The McKinley-Darragh Vein.

"This deposit, so far as could be seen, is much like the La Rose. It lies at the southern end of Long lake. The ore consists of native silver, smaltite and cobalt bloom and niccolite.

#### The Little Silver Vein.

"This, although having the smallest width of the four, is in many respects the most interesting of the group. Here a bare cliff of rock, 60 or 70 ft. high, faces west. The vein cuts this face at right angles and has almost a vertical dip. The vein is weathered away leaving a crack in the face of the cliff 2 ft., and in some places 4 or 5 ft., in depth. When I saw it first it had not been disturbed. Thin leaves of silver up to 2 in. in diameter were lying on the ledges, and the decomposed vein matter was cemented together with the metal, like fungus in rotten wood. It is a vein such as one reads of in text books; being so clearly defined and so rich in contents.

"It was found impossible to get a fresh sample of the ore with the prospecting pick, the vein being so much decomposed. The weathered specimens, however, in addition to the native silver, contained cobalt bloom. The unaltered ore will be found, in all probability, to consist of smaltite and niccolite, in addition to silver."

### LUCKY CROSS SOLD.

The Lucky Cross mine at Swastika was auctioned in Toronto last week. It was purchased by the bondholders for about \$60,000. Mr. W. E. Smith bid \$50,000.



# Early Days at Cobalt

In the year 1903 men were working in the vicinity of Cobalt lake on the construction of the T. and N. O. Ry., and Ontario Government enterprise intended to open up the agricultural area further north. Cobalt lake, then known as Long lake, was at that time one of numerous attractive forest bound lakes occasionally visited by tourists and trappers travelling between Lake Temiskaming and Temagami. The nearest settlement was at Haileybury, an old Hudson Bay post on Lake Temiskaming 4 miles away.

The plans for construction of the T. and N. O. Ry., provided that the line should touch the shore of Lake Temiskaming in the vicinity of Haileybury. It was also arranged that Lake Temagami, already known as a camping ground for tourists, should have railway facilities. Between Temagami and Haileybury the road crossed the Montreal river, at Latchford, thus giving access to a navigable stream. All along the line were forests that might be converted into pulpwood. Here and there were areas covered with pine; but there was little large timber. There was very little good agricultural land. It looked therefore as though the portion of the road between Temagami and Haileybury might derive some revenue from the pulpwood industry and tourist traffic; but the prospects for a considerable amount of business were not encouraging.

There were no experienced prospectors among the gangs engaged in grading, but apparently some of the workers noticed early in 1903 peculiar minerals in the rocks in the cuttings near Long lake.

The pink color of erythrite, or Cobalt bloom, could scarcely have escaped the attention of the workmen. It is not surprising, however, that the nature of the substance was not recognized, for at that time cobalt bloom was a rare mineral in America. The mineral was even unknown to experienced Canadian prospectors. Outside of mineralogical collections there was practically none in North America.

But while cobalt bloom was regarded as a mere curiosity, because its significance was not yet understood, the copper colored mineral which occurred with it aroused considerable interest. This mineral, peculiarly enough, contained no copper; but it was thought to be a copper ore. The mistake was a natural one for instead of being one of the common copper ores the mineral was niccolite, a comparatively rare mineral. Prospecting of the deposits containing niccolite led to a claim being staked for copper.

Apparently the first to suspect the presence of silver were Ernest Darragh and J. H. McKinley. These men, who made the first application for a mining claim on Aug. 14, 1903, were getting out ties for the railway. At the south end of Long lake they found loose pieces of rock containing a metallic mineral which they supposed to be silver. They located the claim which later became known as the McKinley Darragh. Specimens sent to Dr. Milton Hersey of Montreal were found to be rich in silver. No work was done on the claim until the following spring.

Meanwhile at the north end of Long lake Fred La Rose, a blacksmith employed by the contractors on the railway work, found a mineralized vein on what is now known as the La Rose property. He did some work on this in his spare hours and opened up a

very rich deposit. He did not recognize the rare minerals and the native silver; but he thought he had located a valuable copper deposit. He applied for a mining claim on September 29, 1903.

Fortunately Mr. T. W. Gibson, Deputy Minister of Mines, happened to be in Haileybury about this time and he was shown a specimen of niccolite by Mr. Ferland. Mr. Gibson sent a sample to Dr. W. G. Miller, Provincial Geologist, and suggested that he visit the locality before the close of navigation.

Dr. Miller reached Haileybury early in November. He says in his report. "At the time of my arrival in the district, 4 veins, all of which were very rich, had been found. Three of these were within sight of the railway and the fourth a short distance to the south east. The blackened tarnished silver had up to that time attracted little or no attention, although it occurred in profusion in two or three of the weathered outcrops." One may well imagine the delight of La Rose on learning that his little "copper" deposit was in reality a very rich silver deposit containing native



Cobalt in 1905.

silver associated with arsenides of nickel and cobalt.

Two of the veins referred to by Dr. Miller were the McKinley Darragh and the La Rose. The other two were discoveries made by Thomas Hebert. One of these was found east of the lake on what is now Nipissing property. Hebert made this discovery on Oct. 21. A few days later he found the "Little Silver" vein in the hill southeast of the lake.

Soon after these four discoveries were made snow began to interfere with prospecting. During November Neil King discovered a deposit on what became known later as the O'Brien property. He staked out 160 acres. During the winter none of the claims were developed.

These several discoveries were made by men without mining experience or sufficient capital for development work. La Rose shared his discovery with his boss, Duncan McMartin, and later sold his interests to Henry Timmins, Noah Timmins, D. A. Danlap, John McMartin and Duncan McMartin. McKinley and Darragh sold an interest in their discovery and a company was organized to operate the property. Hebert sold his interests to Messrs. Ferland, Galbraith, Cham-

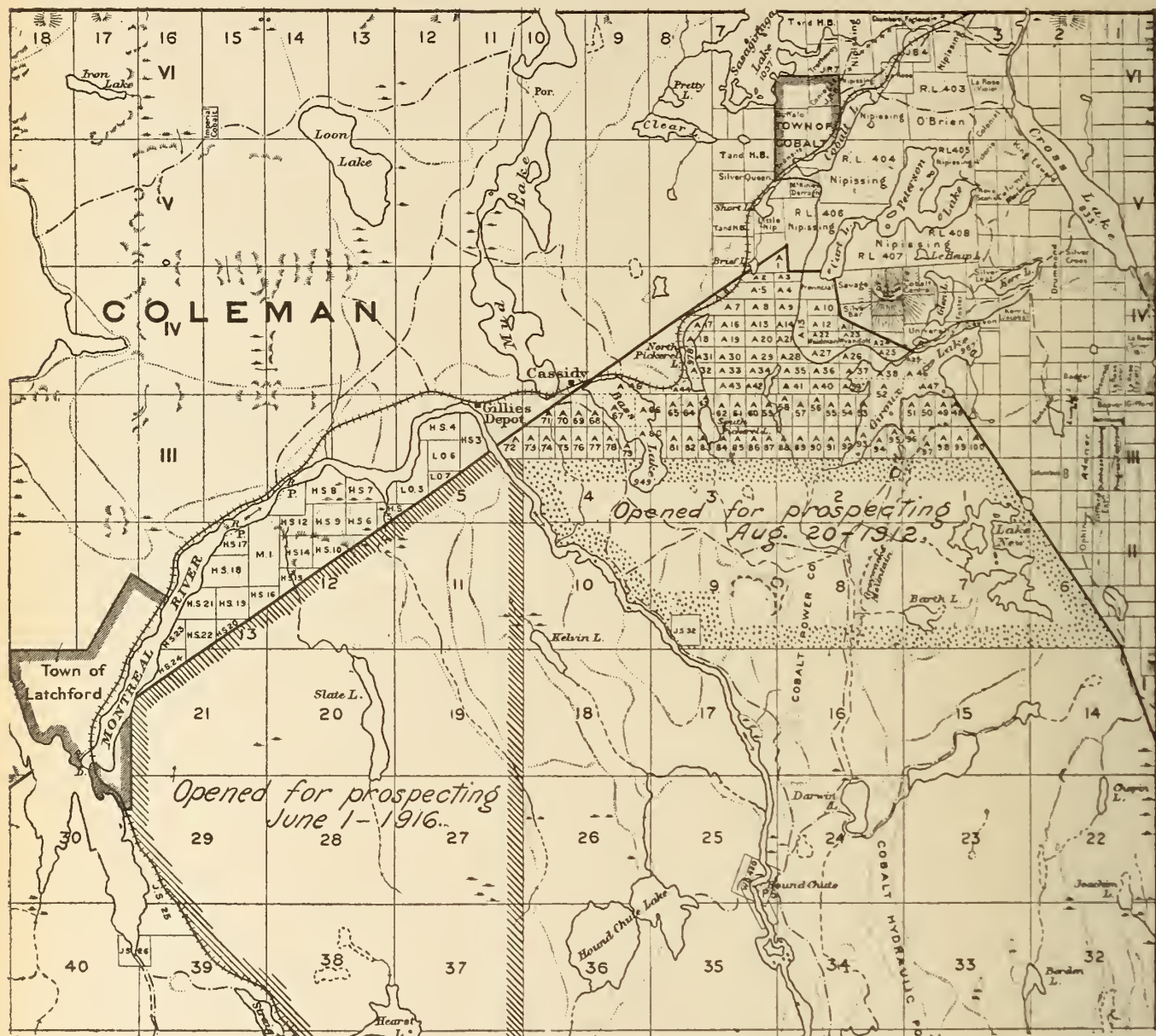


bers and Russell who resold to E. P. Earle. Mr. Earle organized the Nipissing Mining Company in December 1904.

During November 1903 several accounts of the discoveries were published, but little interest was aroused. The rich specimens brought down by Dr. Miller were regarded as very interesting; but few realized what the discovery meant. One of the few was W. G. Trethewey. He went north as soon as the snow melted

and Hudson Bay Co., organized in 1903 by a number of New Liskeard merchants. The prospectors sent out by this company apparently did not in all cases comply with the Mines Act and failed to get titles for all the claims. They made one find at the Silver Queen south of the Buffalo, and another north of the Trethewey.

Cobalt lake was now nearly surrounded by claims and the prospectors went further afield. Soon several



Sketch map showing Cobalt and Gillies' Timber Limit.

and in a few days after reaching Haileybury had discovered and staked the claims known as the Trethewey and Coniagas. Alex. Longwell who was prospecting for R. W. Leonard helped Trethewey to stake the two claims. Leonard and Longwell acquired an interest in the Coniagas.

Longwell prospected further south and discovered a vein and staked what is now the Buffalo property.

While the first real discoveries west of Cobalt lake were made by Trethewey and Longwell, numerous claims had been staked out there by the Temiskaming

claims were staked near Kerr lake and during the following year most of the intervening ground was taken up.

Early in 1904 Dr. W. G. Miller assisted by Mr. C. W. Knight began the mapping of the Cobalt area. At Dr. Miller's suggestion the name Cobalt was adopted for the station and post office and the name Long lake was changed to Cobalt lake. Shipments of ore were made during the year and the richness of these shipments soon brought the district to the attention of the mining world.



# Ontario's Metalliferous Production

Jan. 1 to July 1 1917.

Returns received by the Ontario Bureau of Mines from the smelters, refining works and metalliferous mines of the Province for the six months ending June 30th, 1917, are summarized in the table below, which gives comparative figures for the corresponding period in 1916.

SUMMARY OF METALLIFEROUS PRODUCTION, FIRST SIX MONTHS, 1917

Product		Quantity		Value	
		First Six Months 1916	First Six Months 1917	First Six Months 1916	First Six Months 1917
Gold .....	Ounces	235,060	228,673	\$4,822,740	\$4,586,941
Silver .....	"	10,267,743	10,073,787	6,188,268	7,584,439
Cobalt (metallic) ..	lb	121,817	162,250	103,677	237,004
Nickel (metallic) ..	"	13,933	45,864	5,899	19,073
Nickel (oxide) .....	"	410,408	5,495	204,638	1,648
Cobalt (oxide) .....	"		153,498		175,308
Other Cobalt and Nickel Compounds ..	"		122,076		15,879
Molybdenite .....	"	12,631	36,777	13,075	47,492
Lead .....	"		912,934		114,953
Copper Ore .....	Tons	922	1,543	14,368	45,688
Nickel in matte .....	"	20,651	20,230	10,325,766	10,115,000
Copper in matte .....	"	11,426	10,381	4,207,620	4,152,400
Iron Ore (exported) ..	"		24,332		85,135
Pig Iron .....	"		40,968		715,912
				\$25,886,052	\$27,897,322

It will be noted that above figures are for pig iron produced from Ontario ore only. Export figures for 1916 are not available for iron ore. Nickel and copper in matte have been valued at 25 and 20 cents per pound, respectively, whereas copper was valued at 18½ cents per pound in 1916.

**GOLD:** It was anticipated that the production for the half year would show a decline as compared with the same period in 1916, owing to labor troubles and labor shortage at the Porenpine camp. Nearly all the mines, including the Hollinger and Dome, have been developing their orebodies and increasing milling capacity in preparation for the time after the war when labor will be more plentiful and operating costs decreased. In the meantime production and dividends have been curtailed.

New producers are Gold Reef and Tommy Burns at Porenpine, Teck-Hughes at Kirkland Lake and Miller-Independent at Boston Creek. A single stamp is dropping at the Rognon on Wabigoon lake, District of Kenora.

Mines, in order, producing 5000 ounces or more gold were Hollinger, McIntyre, Dome, Porenpine Crown, Tough Oakes, Schmaacher and Porenpine V. N. T.

**SILVER:** High prices for silver, which averaged 75.41 cents for the half year as compared with 62.53 cents for the same period in 1916, have stimulated production from the Cobalt camp. The lowest New York price was 71.75 cents on March 27th, and highest 78.61 on February 15th. This advance in value has offset increased mining costs.

If the Miller Lake O'Brien continues shipping at the same rate throughout the year, Gowganda will show a record production for 1917. The increase is attributed to the high grade vein discovered in the summer of 1916.

The Hargrave mine is now shipping regularly. A new shipper this year is the National, formerly the King Edward mine. The Mining Corporation of Can-

ada (Cobalt Lake and Townsite-City mines) shipped over 2,000,000 ounces in the half year.

Shippers of 500,000 ounces or more were as follows: Nipissing, Kerr Lake, O'Brien, Beaver and Coniagas mines. Silver recovered from gold ores totalled 38,492 ounces and from copper ores 646 ounces.

**NICKEL-COPPER:** The production of nickel copper matte at Copper Cliff and Coniston shows a small decrease as compared with the same period in 1916, due to shortage of labor.

Assays of samples of nickel-copper matte for their precious metal contents were made for the Royal Ontario Nickel Commission by Ledoux and Company of New York. Platinum and palladium were found in quantities varying from 0.32 ounces to 1.97 ounces per ton of matte. These metals are quoted at \$100 per ounce.

The British America Nickel Corporation has announced that their new electrolytic refinery will be located at Murray Mine, and will have an initial capacity of 5,000 tons of nickel per annum.

The Port Colborne refinery of the International Nickel Company will produce 7,500 tons of nickel, and provision is made for quadrupling the capacity.

**COPPER:** Shipments for the half year came from three sources. The Tip Top mine near Kashabowie, the Hudson Copper Company at Havilah, and the Kenyon Copper Company of Massey. The last mentioned operates the Massey mine, where a 100-ton Callow flotation mill is producing 20 per cent. concentrates. Shipments from Bruce Mines are included under nickel copper.

The Port Arthur Copper Company at Mine Centre is erecting a concentrator and will be shipping soon.

**IRON ORE AND PIG IRON:** Shipments of ore were from the Helen and Magpie mines of the Algoma Steel Corporation, and a small shipment from Moose Moun-tain. Helen ore is shipped to the Magpie mine for treatment. In all 61,796 tons worth \$231,937 was marketed, of which 24,322 tons was exported to the United States.

Pig iron produced at Sault Ste. Marie, Hamilton, Port Colborne and Deseronto totalled 317,190 tons worth \$6,067,950. Out of a total of 577,773 tons of ore smelted only 77,202 tons came from Ontario, and in the table the quantity of pig iron produced and value of the same is figured on a pro rata basis.



**MOLYBDENITE:** The production of this ore is increasing rapidly. Concentrators are now in operation at Renfrew, Mt. St. Patrick and Ottawa, and in the half year treated ore from 13 different mines. At Orillia and Belleville 80,334 pounds of ferro-molybdenum worth \$200,835 was produced.

**LEAD:** Smelters at Galetta and Kingston produced 912,934 pounds of pig lead worth \$114,953 from Ontario ores. The Kingston Smelting Company also treated 1,895 tons of lead ore from the United States. Ontario ore came from the Galetta and Frontenac mines.

### ONTARIO'S GOLD PRODUCERS.

In 1916 Ontario gold mines produced 497,833 ounces of gold, worth \$10,339,259, an increase over 1915 of \$6,245 ounces, or \$1,837,868. The production according to localities or source was as follows:

	Ore Milled. Tons	Gold	Value	Recovery per ton
Poreupine .....	1,330,562	452,097	9,397,536	7 06
Kirkland Lake ..	39,865	33,991	702,761	17 06
Munro township .	477	2,495	51,578	108 13
Long Lake .....	26,847	9,230	187,003	6 97
Miscellaneous ...		20	381	.....

Total ..... 1,397,751 497,833 10,339,259 .....

In addition to the gold production, 91,873 ounces of silver worth \$60,118 was recovered.

The aggregate value of gold produced in Ontario to December 31st, 1916, was \$33,663,648.

The chief gold producers in 1916 were:

Mine.	Tons	Ounces	Value.
Hollinger Consolidated ..	601,854	244,139	\$5,046,652
Dome Mines .....	444,900	103,809	2,142,939
*Poreupine-McIntyre ...	136,489	55,756	1,209,276
Tough-Oakes .....	39,865	33,991	702,761
Poreupine-Crown .....	51,273	27,877	575,725
Schumacher .....	46,463	10,844	244,157
Long Lake .....	26,846	9,230	187,003
Poreupine-Vipond .....	43,041	8,508	175,874
Croesus .....	1,477	2,495	51,578

\*Includes McIntyre-Jupiter and McIntyre-Extension.

The Hollinger Consolidated is an amalgamation of the Hollinger, Acme and Millerton mines and Claim 13147 of the Canadian and Mining Finance Company. A merger of the McIntyre, McIntyre-Extension and McIntyre-Jupiter was consummated at the close of 1916, under the name Poreupine McIntyre Mines Limited, the capitalization of the new company being \$4,000,000. Operating cost at Poreupine increased materially during the year, due to labor shortage and high prices of supplies. Although the milling capacity was increased 35 per cent., the increase in production was not as great as it would have been under more favorable conditions.

At Kirkland lake, development has been impeded by a shortage of power. A 65-mile electric transmission line from Cobalt was completed in March, 1917. For some time past the Tough-Oakes mine has obtained an insufficient supply from Charlton, but the Teek-Hughes, Wright-Hargrave, Sylvanite, Lake Shore, and other properties are now supplied, the immediate requirements of the camp being about 2,000 horse power.

The new gold camps at Boston Creek and Kowkash are giving good promise under the development now proceeding. Gold has also been found in Cairo, Powell and Alma townships, an area lying about twenty miles to the north of Elk Lake. The pre-Cambrian formations of northern Ontario offer prospectors as good inducements as any part of the continent, especially for gold.

### ONTARIO SILVER PRODUCTION.

During 1916 the total shipments of silver from Ontario mines amounted to 20,007,367 fine ounces of which 91,872 ounces was recovered from auriferous ores, 299 ounces from copper ores and 106 ounces from lead ores. As compared with 1915, the output shows a decrease of 4,816,293 ounces, or nearly 20 per cent. Notwithstanding this, the valuation exceeds that of 1915.

The return to the mining companies was \$12,789,955, or an average of 63.512 cents per ounce. High prices for the metal stimulated production, despite the labor shortage and high cost of materials incident to the war. The average New York price for the year was 65.661 cents per ounce, as compared with 49.69 cents in 1915. The lowest figure in 1916 was 55 7-8 cents, and the highest 77 1-4 cents. The enhanced price of the metal is due chiefly to the great demand from belligerent countries, where silver is being coined at an increased rate to replace gold withdrawn from circulation.

The silver production in 1916 according to camps was as follows:

Casey township .....	445,900 oz.
Cobalt proper .....	19,008,517 oz.
South Lorrain .....	77,280 oz.
Gowganda .....	383,393 oz.
Silver recovered from gold, copper and lead ores .....	92,277 oz.

Total ..... 20,007,367 oz.

Since the discovery of silver at Cobalt in 1903 shipments from the camp and outlying silver areas have been as follows:

	Average price, cents per ounce.	Ounces.	Value \$
1904 .....	57.2	206,875	111,887
1905 .....	60.4	2,451,356	1,360,503
1906 .....	66.8	5,401,766	3,667,551
1907 .....	67.5	10,023,311	6,155,391
1908 .....	52.9	19,437,875	9,133,378
1909 .....	51.5	25,897,825	12,461,576
1910 .....	53.5	30,645,181	15,478,047
1911 .....	53.3	31,507,791	15,953,847
1912 .....	60.8	30,243,859	17,408,935
1913 .....	57.8	29,681,975	16,553,981
1914 .....	54.8	25,162,841	12,765,461
1915 .....	49.69	24,746,534	12,135,816
1916 .....	65.661	19,915,090	12,643,175

Total ..... 255,322,279 \$135,829,548

It will be noted from the above figures that the decline in silver production since 1911 has been much less rapid than the rise prior to that date.

### OPTION TAKEN ON GRASSY RIVER CLAIMS.

The Pas, Man. Aug. 31.—Walter Neal has taken a two months' option on Grassy River claims situated several miles beyond the McCafferty properties. The claims optioned are five, owned by Burton and Salter, and A. C. Wright, of The Pas, who receive \$15,000 cash, and a quarter interest in the company when formed. The gold vein is said to be 30 to 60 feet wide, and about 2,000 feet in length.

Mr. Neal will put a force of men on immediately to strip and sample. This deal is similar to that of the Rex, owned by the Mines Exploration Co., which company Mr. Neal represents. If the sampling proves satisfactory, a working mine will be established within two years. The property is an ideal one, being situated between two rapids, that will furnish all the power required by the mine, and the Rex Mine could also be electrified from there.—The Pas Herald.



### THE BRITISH AMERICA CORPORATION'S SMELTERY.

As announced in our last issue the power problem of the British America Corporation has at last been solved and work is to proceed forthwith on the construction of smelting and refining works at Murray mine. The announcement lends new interest to an article recently written by Mr. E. P. Mathewson, general manager of the Corporation for the "Engineering and Mining Journal." Mr. Mathewson writes in part:

"At first it was thought advisable by the new board of directors to build the smeltery near the mine and the refinery on the Niagara Peninsula, but when the present management investigated data, it was found expedient to change this plan and build the smeltery and refinery adjacent to each other on the site chosen for the smeltery in the first place. Preliminary work has been done, and a force of about 250 men is now at work putting in trackage and building foundations. The machine shop and warehouse are already up and in use. The site is connected by rail to the Canadian Pacific Ry. and the Algoma Eastern systems. The principal ore supply will be from the Murray mine, about one mile distant from the smeltery and connected therewith by standard-gauge railway.

"The ore coming from the mine will be picked on picking belts and screened over 3-4-in. grizzlies. The coarse ore will be smelted in blast furnaces to a 10 per cent. copper-nickel matte; the fines will be added to converter charge.

"The blast furnaces will be four in number, 25 ft. in length by 50 in. wide at tuyeres, but so arranged that if necessary they can be coupled together to give nearly double the hearth area. These furnaces are to be charged from both sides and will tap into the usual settlers, the slag being drawn off into slag cars and transported to the dump by electric locomotives.

"The converter plant will be larger than usual and will consist of seven of the latest type of Pierce-Smith converters, with shells 13 ft. in diameter by 30 ft. long, outside measurements. These will be fitted with the Garr silica gun. A portion of the converter slag will be cast on the converter floor, broken up and used in the blast furnaces as flux. The remainder will be poured into the blast-furnace forehearth for settlement. The converter matte produced will contain about 80 per cent. copper and nickel, approximately 1 per cent. iron, the remainder being mostly sulphur. This will be granulated and taken to the refinery, where it will be roasted in mechanical furnaces of the Wedge type, then leached to extract the bulk of the copper, which will be recovered electrolytically using insoluble anodes. The residue from the leaching will be melted down and cast into anodes which will be electrolyzed by the Hybinette process.

"The smeltery building proper will be 160 ft. wide and 360 ft. long; the refinery building, 225 ft. wide by 400 ft. long. In addition to these buildings there will be provided shops, changehouse, clubhouse, laboratory, general office, warehouse, power house, substation, etc. The capacity of the plant to be installed will be about 2500 tons of ore per day, or a nickel production of 10,000 tons per annum.

"Power will be secured from the Hydro-Electric Commission of Ontario, and all machinery will be operated

by electricity. However, a steam plant of about 1000 h.p. will be required to heat the various buildings and solutions. Steam-generator sets will be used as pressure reducers, the electricity to be used in connection with the main power plant and also for emergency purposes. The main power plant will consist of steam-generator sets, turbo-blowers, electrically driven for both converters and blast furnaces, air compressors, motor generator sets, etc. About 10,000 e. h.p. will be necessary for the operation of the plant.

"Owing to war conditions, causing great scarcity of labor and making it extremely difficult to obtain supplies, it will probably be two years from the date of this publication before the plant will be in full operation. In the meantime a great deal of development work has to be undertaken at the Murray mine to insure a sufficient supply of ore for the smeltery."

### BRITISH AMERICA NICKEL COMPANY'S DISCOVERY.

During the past few weeks several papers have printed the following under a Christiania date line:

"The Christiania office of the British America Nickel Corporation received a telegram from a representative of the British Government on the board of directors in Canada to the effect that an important discovery had been made in the Murray mine, the chief mine of the company. It is said a layer 80 feet thick, rich in nickel and copper ore has been discovered."

Evidently this refers to the discovery made in diamond drilling this summer at Murray mine. A hole located 400 ft. south of the known orebody was sunk for the purpose of locating a shaft. The drill encountered excellent ore, in fact better grade than that previously developed. It is not unlikely that this



Murray Mine, where smeltery is to be built.

is an extension of the Murray orebody. If so a very large increase in tonnage has been indicated. In any case an orebody of considerable importance has been found.

An important feature of the new discovery is the fact that the drilling was done between two known orebodies,—the Murray and the Elsie. It may prove that the Elsie is a continuation of the Murray.

The Corporation is controlled by the British Government which hold \$14,500,000 of the \$20,000,000 capital stock and one half the \$3,000,000 bond issues.



### HIGH PRICE OF SILVER EXTENDS LIFE TO COBALT MINES.

The phenomenal rise in quotations for commercial bar silver to a level unprecedented in the history of mining in Cobalt is a factor that is going far to urge the mine operators to force production at the maximum. During the first half of the current year the total output from the Cobalt camp approximated 10,000,000 ounces. The average value of the product was 75.4 cents an ounce thus lending a value of approximately \$7,500,000 to the product. This fine record, in point of ounces produced, is on a par with that during the first half of 1916 and for the time being puts a stopper on the reduction in output that has taken place since the banner year 1911. The value of the production during the first half of the current year shows an increase of nearly fourteen hundred thousand dollars as compared with a similar period in 1916, and with the price having risen above 95 cents an ounce in the early days of the current month there would appear to be every reason to anticipate a still greater record during the last half of the present year.

By usually well informed authorities on world markets and finance, it is frequently predicted that a remonitization of silver is not improbable. Such a development, having the effect as it would of placing a valuation of upwards of \$1.20 an ounce on the white metal, would serve to make it possible to mine large bodies of low-grade ores and probably serve to make possible the maintenance of an output of around fifteen million dollars annually for some years. Therefore, although the most highly productive days of the camp were those of the past decade, the next may possibly be attended with even greater prosperity.

It is interesting to note that although silver was first mined from Cobalt in 1904, during which year the value of the output was only a little more than one hundred thousand dollars, and the value of the 1905 output was less than one and a half million, there has been mined to date ore worth upwards of one hundred and fifty million dollars. From these actually demonstrated facts it at once becomes evident that Cobalt camp will for considerable time longer hold a prominent place and be a big factor in the silver markets of the world.

The current year's production will perhaps be more valuable than that of either of the three preceding years. During 1915 the price of silver averaged 49.6 cents an ounce. During 1917 it bids fair to average 80 cents or more an ounce. Basing the output at 20,000,000 ounces, every one cent increase per ounce adds just \$200,000 annually to the value of the output. Thirty cents increase therefore means an added value of approximately \$5,400,000 to the value of the year's production.

September 1st, the official quotation for commercial bar silver was 90 3-4 cents an ounce or about 40 cents an ounce above the average for 1915. It is now 95 5-8 cents an ounce. In the order named, the following are the four leading producers in Cobalt:

Nipissing, Mining Corporation, Kerr Lake, and Coniagas. The following performances of Nipissing shows clearly the manner in which production during the current year is being maintained by the Nipissing:

January .....	\$172,983
February .....	271,527
March .....	256,953
April .....	259,082
May .....	261,663
June .....	269,469
July .....	272,490

The following is a summary of the dividend record of Cobalt silver mining companies to June 30th, 1917:

Summary of total dividends paid to June 30th, 1917 by gold and silver mines of Northern Ontario:

#### SILVER

Company	Dividends 1st Half 1917	Total Dividends	Capital Authorized
Nipissing.....	\$900,000.00	\$16,240,000.00	\$6,000,000
Coniagas.....	200,000.00	8,640,000.00	4,000,000
La Rose.....	149,862.70	7,041,571.29	7,500,000
Kerr Lake.....	300,000.00	6,870,000.00	3,000,000
Crown Reserve.....	88,440.70	6,190,840.00	2,000,000
McKinley-Darragh.....	134,861.52	5,011,335.82	2,500,000
Private Corporations.....		3,824,983.30	
Buffalo.....		2,787,000.00	1,000,000
Mining Corporation.....	900,000.00	2,248,750.00	
T. & H. B. (Hudson Bay)....		1,940,250.00	25,000
Temiskaming.....	150,000.00	1,834,156.25	2,500,000
Seneca Superior.....		1,579,817.20	
Trethewey.....		1,111,998.50	1,000,000
Cobalt Townsite.....		966,726.31	
Beaver.....		650,000.00	2,000,000
Wettlaufer.....		637,465.50	1,500,000
Cobalt Lake.....		465,000.00	
Peterson Lake.....	42,031.85	462,350.35	3,000,000
Right of Way Mfg. Co.....		324,643.93	
Cobalt Silver Queen.....		315,000.00	1,500,000
Right of Way Mines.....	8,427.50	244,392.50	2,500,000
Caribou Cobalt (Drummond).....		225,000.00	
Casey Cobalt.....		203,249.33	
Cobalt Central.....		192,845.00	
City of Cobalt.....		139,321.42	
Aladdin Cobalt.....	50,000.00	50,000.00	
Foster.....		45,774.00	1,000,000
Total.....	\$2,923,624.27	\$70,242,470.70	

#### PORCUPINE

Hollinger Consolidated.....	738,000.00	8,034,000.00	25,000,000
Dome Mines.....	300,000.00	1,500,000.00	5,000,000
Porcupine Crown.....	120,000.00	780,000.00	2,000,000
McIntyre-Porcupine.....	361,029.80	361,029.80	4,000,000
Rea Mines.....		12,000.00	
Total.....			

#### KIRKLAND LAKE

Tough-Oakes.....	\$65,187.50	\$391,125.00	3,000,000
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Summary of total dividends paid to June 30th 1917 by gold and silver mines of Northern Ontario:

	Totals
Cobalt.....	\$70,242,470.70
Porcupine.....	10,687,029.00
Kirkland Lake.....	391,125.00
Grand Total.....	\$81,320,625.50

In addition to the foregoing record, it might be mentioned that the Croesus mine in the township of Munro is understood to be yielding handsome profits, but, as the mine is privately owned, financial statements are not available. The Miller Lake O'Brien mine of Gowganda is another privately owned property now understood to be on a profit yielding basis.

# BRIGHT FUTURE FOR GOLD MINES OF NORTHERN ONTARIO.

Due to the high cost of supplies, shortage and inefficiency of labor, high wages and slow delivery of material, the gold mine operators of Northern Ontario have labored under conditions heretofore never experienced in the history of the country. Although the uphill pull has made itself seriously felt for a year or more, the more important mines have been kept in operation. Production, of course, has been permitted to fall off and energy has been largely directed toward aggressive development work putting the various mines in shape to launch out into heavy production campaigns during the post-war era when the expected decline in costs commences.

Taking into consideration facilities for handling and treating ore together with the official estimate of ore reserves, the seven leading mines of the Porcupine camp are in the following order:

Hollinger Consolidated, Dome Mines, McIntyre-Porcupine, Porcupine-Crown, Schumacher, Porcupine V. N. T., and Dome Lake.

In the Kirkland Lake gold area there are two producing gold mines, namely: the Tough-Oakes, and the Teck Hughes. Two others will probably be producing by early next summer, namely: Lake Shore, and Kirkland Lake Gold. In addition to the four mines mentioned, there are two other properties which are on a fair way to qualify for the producing class: they are Wright-Hargraves and La Belle Kirkland. In the Boston Creek gold area there is one producer, the famous Croesus. In Boston Creek field, the Miller Independence is, as yet, the only producer. The following table is an estimate of the grade of ore and probable output based on operations conducted under normal conditions:

Summary of probable production with present milling facilities operating at capacity:

## PORCUPINE

Mine	Daily Tonnage	Daily Grade	Daily Production	Monthly Production	Annual Production
Hollinger Con.	2800	\$8.00	\$22,400	\$672,000	\$8,064,000
Dome Mines	1500	5.00	7,500	225,000	2,700,000
McIntyre-Porcupine	600	12.50	7,500	225,000	2,700,000
Schumacher	300	7.00	2,100	63,000	756,000
Porcupine Crown	180	10.00	1,800	54,000	648,000
Porcupine V. N. T.	120	10.00	1,200	36,000	432,000
Dome Lake	100	7.00	700	21,000	252,000
<b>Totals</b>	<b>5,600</b>		<b>\$13,200</b>	<b>1,296,000</b>	<b>\$15,552,000</b>

## KIRKLAND LAKE

Tough-Oakes	120	\$20.00	\$2,400	\$72,000	\$864,000
Teck Hughes	80	10.00	800	24,000	288,000
<b>Totals</b>	<b>200</b>		<b>\$3,200</b>	<b>\$96,000</b>	<b>\$1,152,000</b>

## MUNRO

Croesus	50	\$50.00	\$2,500	\$75,000	\$900,000
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## BOSTON CREEK

Miller Independence	30	\$10.00	\$300	\$9,000	\$108,000
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District	Daily Tonnage	Daily Output	Monthly Output	Annual Production
Porcupine	5,600	\$13,200	\$1,296,000	\$15,552,000
Kirkland Lake	200	3,200	96,000	1,152,000
Munro	50	2,500	75,000	900,000
Boston Creek	30	300	9,000	108,000
<b>Totals</b>	<b>5,880</b>	<b>\$19,200</b>	<b>\$1,476,000</b>	<b>\$17,712,000</b>

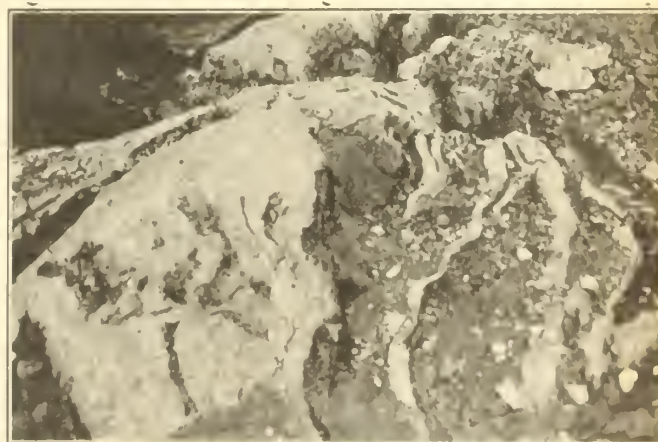
Thus, with the foregoing record of past operations, not forgetting the increased facilities for treating exceedingly large tonnages of ore, and with the official estimate of ore reserves at the gold mines of this district ranging upwards of seventy-five million dollars and with probabilities of this figure being multiplied, the future of gold mining in this district would indeed appear to be fraught with exceptional opportunities.

During the first half of 1916 the production of gold from the mines of Ontario, principally Porcupine and Kirkland Lake was as follows:

	Ounces	Value
For the first half of 1917 it was	235,060	\$4,822,740
	228,673	4,586,941
<b>Decrease</b>	<b>6,387oz.</b>	<b>\$235,799</b>

The fact that, despite extremely adverse conditions, production was so well maintained, would appear to offer reason for anticipating exceptionally favorable developments as conditions at the mines improve. With the expected improvement in labor supply and reasonable costs of material the production of gold will far surpass all previous records in the history of gold mining in Ontario. The gold mining industry of Northern Ontario is less than ten years old. The next decade will witness wonderful development for there is much ore already proved and the chances of finding more ore are excellent.

At the present time there is a shortage of nearly one thousand men in the gold camps of the north and with this fact in mind it would appear unfair to compare the estimate of the current year's output with that of 1916 during the latter year of which the laboring forces were comparatively satisfactory. Of course, taking into account the ore reserves at the end of 1916 and the probable ore reserves at the end of the current year, the comparison would be altogether quite satisfactory. At the present rate of operation the total ore reserves of Porcupine alone will by the end of 1917 approximate seventy-five million dollars, something like one-half or more of which belongs to Hollinger Consolidated.



A Gold Quartz Outcrop, Hollinger Mine.

## MOND EMPLOYEES' PATRIOTIC CONTRIBUTION.

The second year of the united efforts of the employees of the Mond Nickel Company, Ltd., to assist in a good way, Patriotic and Red Cross endeavors, came to a close July 31st. The total contributions for the year amounted to the handsome sum of \$17,282, a decrease as compared with last year, when the amount was \$21,880. The total systematic contributions at Comiston show a substantial increase. Local committees at each mine, etc., direct to what objects the contributions shall be paid.



### THE FLOTATION LITIGATION.

Boston—In reply to inquiries of the Boston News Bureau concerning various phases of the litigation which the Minerals Separation Co. has brought against prominent mining companies, Counsel Henry D. Williams for the Separation Co. says:

"As to the importance of flotation to these companies the best evidence is the fact that they have extensively used it at the risk of being held as trustees for the patent owners and compelled to pay all their profits from flotation to the patent owners. They have no legal right to continue such use and there is no escape from their liability for the past, even should they now discontinue the highly profitable use of flotation.

"As to your suggestion that the Supreme Court decision of last December limited the patent to the use of a fraction of 1 per cent. of oil, the fact is that the Supreme Court very carefully avoided such a limitation. Instead of saying that the patent must be confined to the use of oil within proportions amounting to a fraction of 1 per cent. on the ore the Supreme Court said: 'The patent must be confined to the results obtained by the use of oil within such proportions, and Judge Bourquin has interpreted this as meaning the results obtained by the beneficial use of a fraction of 1 per cent. of oil and has held that all of the operations with 1 per cent. or more of oil which were proved at the Butte trial involved the wasteful, useless and even injurious addition of inert or ineffective amounts of oil in excess of a fraction of 1 per cent. Judge Bourquin says:

"Patent law is not concerned with the useless, and a valuable result sought is not 'obtained' by the use of an excess of an essential ingredient, which excess renders no or ill-service. From the evidence it appears the larger part of the oil used by defendant and all in excess of a fraction of 1 per cent. on the ore, if not inert is ineffective, wasted, and injurious to the process and results."

Judge Bourquin further says that the Butte & Superior Mining Co. on its own reports shows a loss of \$1.75 per ton of ore on 45,000 tons monthly in its operations employing 1 per cent. or more of oil as contrasted with its operations using 1.43 pounds of oil to the ton of ore (less than one-tenth of one).

Judge Bourquin says in conclusion (and this has been partly and not quite accurately published from telegraphic reports):

"Defendant uses the patent process, uses plaintiffs' invention of ore concentration by air bubble flotation, uses the same elements in the same combination in the same way with the same function to the same but poorer results; and exceeding the patent claims in reference to one ingredient (oil), uselessly, wastefully and injuriously and merely with intent to avoid the letter of the patent, does not avoid infringement. The addition of the excess oil no more adds to or changes the process, no more avoids infringement than would the addition of milk or other useless substance not a part of the process. The excess oil exercises either no function or less efficiently exercises the same function in the same way as the limited oil, and to the same but poorer results. To secure to patentees their invention, the law looks quite through mere devices and forms to the substance of things. And if in substance the invention is taken, if the thing that does the work is taken, all devices to evade the letter of the patent avail nothing to escape the consequences of infringement. Neither principle nor au-

thority to the contrary is cited or known to the court."

Judge Bourquin's decision was reached after most careful and elaborate arguments as to the meaning of the decision of the Supreme Court in the Hyde case, and it applies the findings of law by the Supreme Court in the Hyde case to the facts as proved in the Butte & Superior case.—Boston News Bureau.

### MIAMI WILL NOT APPEAL.

Wilmington, Del.—A mandate was filed in United States District Court here Monday afternoon by United States Circuit Court of Appeals for third circuit, in suit of Minerals Separation, Ltd., of Great Britain, vs. Miami Copper Co., a Delaware corporation. The mandate directs the District Court to enter a decree in accordance with opinion of the Circuit Court.

The suit, begun in the District Court here several months ago, was based on alleged infringement by defendants of three patents on flotation process for mining copper, lead and zinc. The devices of English origin are patented in America, hence the suit.

Opinion of District Court held that the first two patents were infringed, but considered the third patent invalid. The Circuit Court sustained the lower court as to the first two patents and also held that the third was valid and was infringed, making a complete victory for the plaintiff.

Notice was given of appeal to Supreme Court of the United States, but recently the Circuit Court was informed it had been decided not to take an appeal; hence the mandate to the District Court. A decree will be entered accordingly, and the case will proceed to an accounting to ascertain damages and profits.

While amount immediately involved is probably not more than \$2,000,000 or \$2,500,000, many more millions are indirectly concerned, as the same device, it is understood, is or has been in use by a large number of other mining concerns, though they are not defendants in this suit.

### Effect on Companies Using Flotation Process.

The "Boston News Bureau" quotes Henry D. Williams, New York counsel for the Separation Co., concerning various phases of this all important litigation, in part as follows:

"The effort of the Miami Copper Co. to reach the Supreme Court having been abandoned, two proceedings follow as mere matters of form and inevitably. One is a permanent injunction against the Miami Copper Co. restraining further infringement of the three patents in suit, the first patent for flotation with the use of a small quantity of oil, the second patent for flotation with the use of a solution frothing agent dissolved in the ore pulp, and the third patent for flotation with the use of phenol or cresol in the cold and without acid.

"In my opinion this will absolutely prevent the use of the flotation process in any form, with Callow cells now installed, or with any other contrivances. The comfort which Mr. Callow has derived from the opinion of the Philadelphia court has been solely based upon what that court said as to the oil patent. That court said as to the solution patent that the claims "are not confined to a particular device or a particular degree of agitation" and that the means for bringing about the agitation are "described in terms that are wide and inclusive," and then, quoting the specification itself:



"The air or other gas is to be 'liberated in, generated in, or effectively introduced into the mixture,' in order that the ore particles may come into contact with the gas and as a result may float to the surface in the form of a froth or scum which can be separated afterwards by any well known means. The object of introducing the air or other gas into the mixture is such agitation of the pulp as will produce the desired froth, but the claims are not confined to a particular device or a particular degree of agitation."

"I may further add that the difficulties which the Philadelphia Court experienced as to the limitation of the first or oil patent to some particular degree of agitation were all swept aside in the Butte case and shown to be directly contradicted by the very terms of the patent itself.

"As to the accounting, the plaintiff is entitled to all of the profits attributable to the infringing acts. The Miami Copper Co. added flotation at the tail end of its plant to recover metal from material formerly thrown away. All of that recovery is therefore due to flotation, and Minerals Separation, Ltd., is entitled to all of the profits of that recovery.

"The Miami Co. has filed in court sworn reports covering the period from Oct. 5, 1916, to the first of August and showing that the total value of the concentrates recovered by flotation during that period was \$2,765,672. They commenced to use flotation in December, 1913, and thereafter put in their pneumatic or Callow plant, and commenced to operate this in August, 1914. We roughly estimate that their total recoveries in flotation amount to \$5,000,000, that the costs of flotation were very small indeed, and the difference between the actual cost and the value constitutes the profits due to infringement to which Minerals Separation are entitled.

"The accounting will proceed before William H. Mahaffy, the clerk of the court, who has been appointed master by consent of parties to conduct these proceedings. He will summon the defendant before him and proceed to a complete examination of their accounts for the purpose of determining the profits due to infringement. He will have full access to all of their accounts, and can call before him any of their officers and employees to obtain the necessary information. The accounting will be comparatively simple.

"The master's report will be filed, and after approval by Judge Bradford an appeal can be taken to the Court of Appeals, which will, however, only consider questions involved in the accounting. This decision will be final and unappealable, although the losing party will have the right to ask the Supreme Court to call the case up for review.

"In the meantime, however, the Miami Co. will be under injunction, and the most that it can do is to pile up in dumps, subject to deterioration, the valuable tailings from its water concentration plant now treated by flotation and go back to the conditions which prevailed in the plant before flotation was adopted. The patents in suit expire respectively Nov. 6, 1923, June 28, 1927, and June 9, 1931. Until these patents expire the Miami Co. will be absolutely bound by the injunction and can use flotation only with the consent of the owners of the patents.

"In the Butte and Superior suit the sworn reports filed in court by the defendant covering the period from Nov. 1, 1913, to date, show profits of about \$20,000,000 due to flotation. In this instance, the costs of operating the flotation plant appear in the statements and show that they are considerably less than 6 per cent. of the value of the concentrates.

"The Utah, the Chino and the Ray proved their flotation operations with complete tabulated statements in their efforts to help the Butte & Superior Co., so they have supplied evidence of their infringement and its extent. The monetary values have not yet appeared, but will undoubtedly be very large. The fact that the Nevada Consolidated has also infringed was also proved although here the details have not appeared.

"Under the patent laws the patentee is entitled to all of the profits due to the infringement. If, for any reason, the profits cannot be determined, then he is entitled to damages, and the best measure of damages is the royalty usually charged to licensees. Obviously a court will not compel a patentee to take from an infringer merely the compensation willingly given to him by licensees except as a last resort in the event that the profits due to infringement cannot be determined. Had the Jackling group of mines taken licenses, as have the Anaconda, the Inspiration, Senator Clark's and many other mines, they would merely have had to pay reasonable royalties, but as it is, they are faced with a heavy liability for their unlawful acts, as well as the prospect of being deprived of the benefits of flotation during the terms of the controlling patents."

#### ANOTHER VICTORY FOR MINERALS SEPARATION CO.

A decision in favor of the plaintiffs has just been rendered in the case of Minerals Separation, Ltd., and others against Butte & Superior Mining Co., which was tried at Butte, Montana, during April and May last before Judge Bonrquin in the United States District Court. The trial lasted five weeks.

The patent had already been sustained in the Supreme Court of the United States and covers the well known flotation or bubbles process of concentrating ores with the use of a small quantity of oil. The principal contention of the defendant was that infringement of the patent was avoided by using an amount of oil greater than a fraction of 1 per cent. of the ore, to wit, 20 pounds or more of oil to the ton of ore.

Testimony was given in behalf of the defendant of operations by the defendant and by other companies of the Jackling group of mines, to wit, Utah Copper Co. at its Arthur and Magma plants, Chino Copper Co. and Ray Consolidated Copper Co., these operations having been carried on with a fraction of 1 per cent. of oil before the decision of the Supreme Court in December last sustaining the patent, and with 1 per cent. or more of oil after that decision.

These operations involved the treatment of great tonnage. The court finds the patent was just as much infringed by the operations employing more than 1 per cent. of oil as by those employing less than 1 per cent. of oil. The opinion is in part as follows:

"The defendant uses the patent process, uses the plaintiff's invention, uses the same elements in the same combination in the same way with the same furniture to the same but poorer results and exceeds the patent claims in reference to oil uselessly, wastefully and injuriously, merely with intent to avoid infringement. To secure to patentees their invention the law looks quite through mere devices and forms to the substance of things, and if in substance the invention is taken, all devices to evade the letter of the patent avail nothing to escape the consequences of infringement."

The opinion directs an injunction, and the recovery of damages and profits to be determined by an accounting.—Boston News Bureau.



### THE CROESUS GOLD MINE.

Mr. E. L. Steindler, in the Sept. 1 number of the Engineering and Mining Journal says concerning development of the Croesus property:

On the Dobie claim there existed a speetaacular high-grade outcrop, which the owners of the claim had covered with a steel plate, which they kept bolted down and locked, to prevent "high-grading." The initial operations consisted of sinking a prospecting shaft on the vein, and about 30 ft. from the high-grade showing. After sinking 14 ft., ore was encountered equally as rich as the surface showing; this continued down to the 200-ft. level, the shaft alone producing approximately \$1000 to the foot. The vein is a quartz vein with an average width of  $2\frac{1}{2}$  ft., and lies comparatively flat, the dip being only about 20 degrees from the horizontal.

The gold in the vein is free and coarse. In the first 200 ft. of the mine, no gold occurs that is not visible to the naked eye. Unless free gold can be seen, the vein rock is practically barren. The gold occurs like plums in a pudding, but in sufficient quantity to make the average grade extremely high.

During the time the mine was being opened, the high-grade ore was picked out by hand and crushed in a mortar, and the resulting gold amalgamated directly and melted. This produced bullion 910 fine in gold, with about 60 points in silver. The richness of the ore can be best described by saying that of 746 lb. of rock hoisted at one particular time, approximately \$47,000 in gold was produced. All the ore is practically specimen ore. For example, one piece weighing 1 lb. 15 oz., avoirdupois, contained \$292.68 worth of gold, the value having been determined by submersion in water, taking account of the differences in specific gravity. The Ontario Government purchased five pieces of this ore which contained \$10,000 in gold.

Geologically, the high concentration of the gold seems to have been influenced by a shear zone. Aside from this property, none of the surrounding claims has as yet shown any likelihood of being productive. Development has now been carried to the 300-ft. level, at which point the vein has dipped under the shaft, and a crosscut to the vein is being driven. The length of the oreshoot is approximately 80 ft. A small mill has just been completed, consisting only of a picking belt, a  $4\frac{1}{2}$ -ft. Hardinge mill and amalgamating plates. The high-grade and oversize waste is picked off the belt, the fines being crushed and passed over the amalgamating plates. On the dumps are several thousand tons of rejects from the earlier development, which will undoubtedly run \$40 per ton.

The occurrence of this high-grade ore has been misstated in previous descriptions, when described as nuggets, as it is really free-gold in the quartz, but highly concentrated as herein described.

### KERR LAKE.

Kerr Lake Mining Co. produced 200,855 ounces of silver in August, against 189,392 in July, 251,367 in June and an average of 215,500 for 12 months ended Aug. 31.

### ONTARIO SMELTING CO.

Ontario Smelting Co. has just been organized and a site purchased near Joplin, Missouri, for immediate construction of a lead smelter of 600 tons weekly capacity, which is about half the weekly lead production of the district.

### TEMISKAMING ORE RESERVES.

Mr. Balmer Neilly of Cobalt recently examined the Temiskaming mine to estimate ore reserves. He summarizes the positive ore as of Aug. 6, 1917 as follows:

Broken ore.—Assuming 20 cub. ft. broken ore—one ton and assuming mean widths of stopes just above ore and at timbers as the average cross section width.

Vein	tons	tons
No. 19—400-ft. level .....	2,156	
No. 19—500-ft. level .....	6,461	
No. 21—500-ft. level .....	1,246	9,863
<hr/>		
No. 2—300-ft. level .....	50	
No. 8—575-ft. level .....	25	
No. 3—500-ft. level .....	800	
No. 6—650-ft. level .....	150	
No. 8—575-ft. level .....	180	
No. 10—835-ft. level .....	50	
No. 15—400-ft. level .....	150	1,405
<hr/>		
No. 19—530-ft. level .....	150	
No. 19—575-ft. level .....	30	180
		<hr/>
		11,448
<hr/>		
Ore in place—		
No. 19 Pillar above 400-ft. level.....	80	
Pillar above 500-ft. level.....	44	124
		<hr/>
Total .....		11,572

"Since the silver is almost wholly contained in vein matter scattered in coarse pieces throughout the stopes it is manifestly impossible to give anything more than an approximate estimate of ounces contained. In my judgment, based upon sampling and a mill run where we used about 2 per cent. of the first 9,863 tons listed, the whole tonnage shown should produce between 400,000 and 450,000 ounces."

With the exception of a very small pillar standing on the North boundary the present positive ore reserves are all broken. The silver contained is for all practical purposes confined to the vein matter, coarsely distributed through the stopes.

In submitting his estimate Mr. Neilly emphasizes that he refers only to 'positive' ore. He says further:

"The first work undertaken was that of measuring up the stopes and such ore in place as was apparent. Appreciating fully that I must be in a position at the time this report was presented to state that nothing had been overlooked in the way of reserves, a thorough examination of the mine was forthwith begun, careful sampling being undertaken wherever the slightest possibility of ore was apparent. In the course of this work practically every vein and stringer in the mine was examined. The veins were broken along the backs of the drifts, in the walls and wherever exposed. In places samples were taken at regular intervals and, where the vein matter looked particularly barren, at such places as were in any way mineralized. In this manner between 600 and 700 samples were taken and the results obtained are shown in detail on the sample plan. Nothing that approached the significance of ore was found. Those cases where assays are high represent a small portion of the vein left in a small pillar or arch, or an isolated sample that has probably had consideration from your staff."

"Attempting to sample the top of No. 19 stope above the 400-ft. level we found that the muck exposed was





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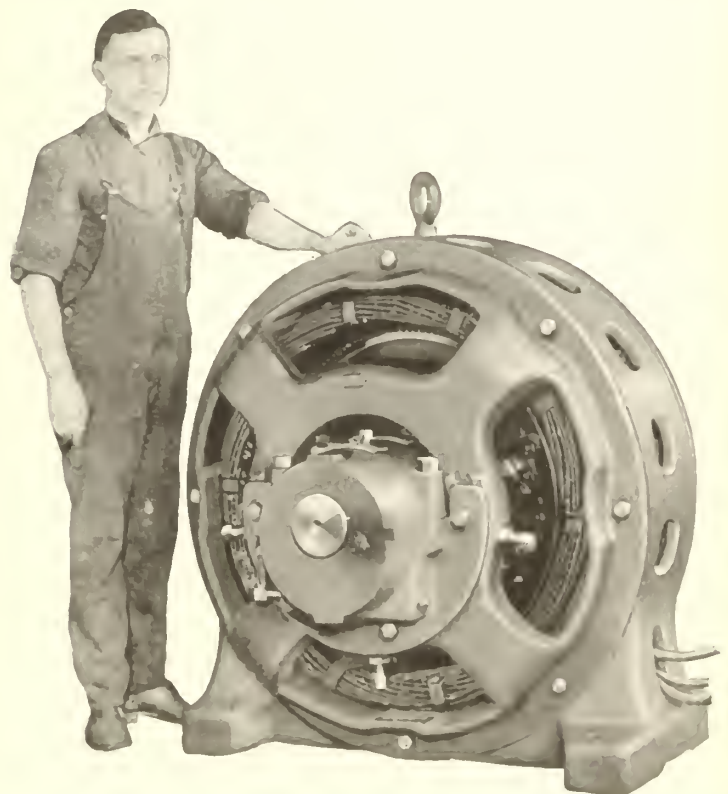
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**RICH GOLD ORE FROM AN ONTARIO MINE.**

During the past few years Ontario has, thanks to the Porcupine and Kirkland Lake districts, become an important producer of gold. In the Hollinger, Dome and McIntyre mines the province has three of the largest gold producers in America.

natural size. The drill mark in the upper right corner shows how the drill holes are in places almost lined with gold. The specimen is, by weight, over one-third gold.

On the opposite page we reproduce photographs of five pieces of Croesus ore. These are shown considerably reduced in size. These five pieces of ore have been



**GOLD ORE FROM CROESUS MINE, NORTHERN ONTARIO.**

(Actual Size.)

This ore is over one-third gold.

Less well known outside of Northern Ontario is the wonderful Croesus mine in Munro Township, twelve miles from Matheson on the T. & N. O. Railway. Here some of the richest ore ever mined is being taken out.

On this page we reproduce in colors a specimen of rich ore from the Croesus. This specimen is shown

purchased by the Ontario Bureau of Mines and have been carefully weighed. They together weigh 38,689 grams and contain 16,431 grams gold and silver. This is equivalent to 528.28 oz. gold and silver, of which 480.7 oz. is gold and 47.5 oz. is silver. The value of the gold and silver in the five pieces, which together weigh about 85 lb., is therefore about \$9,966.

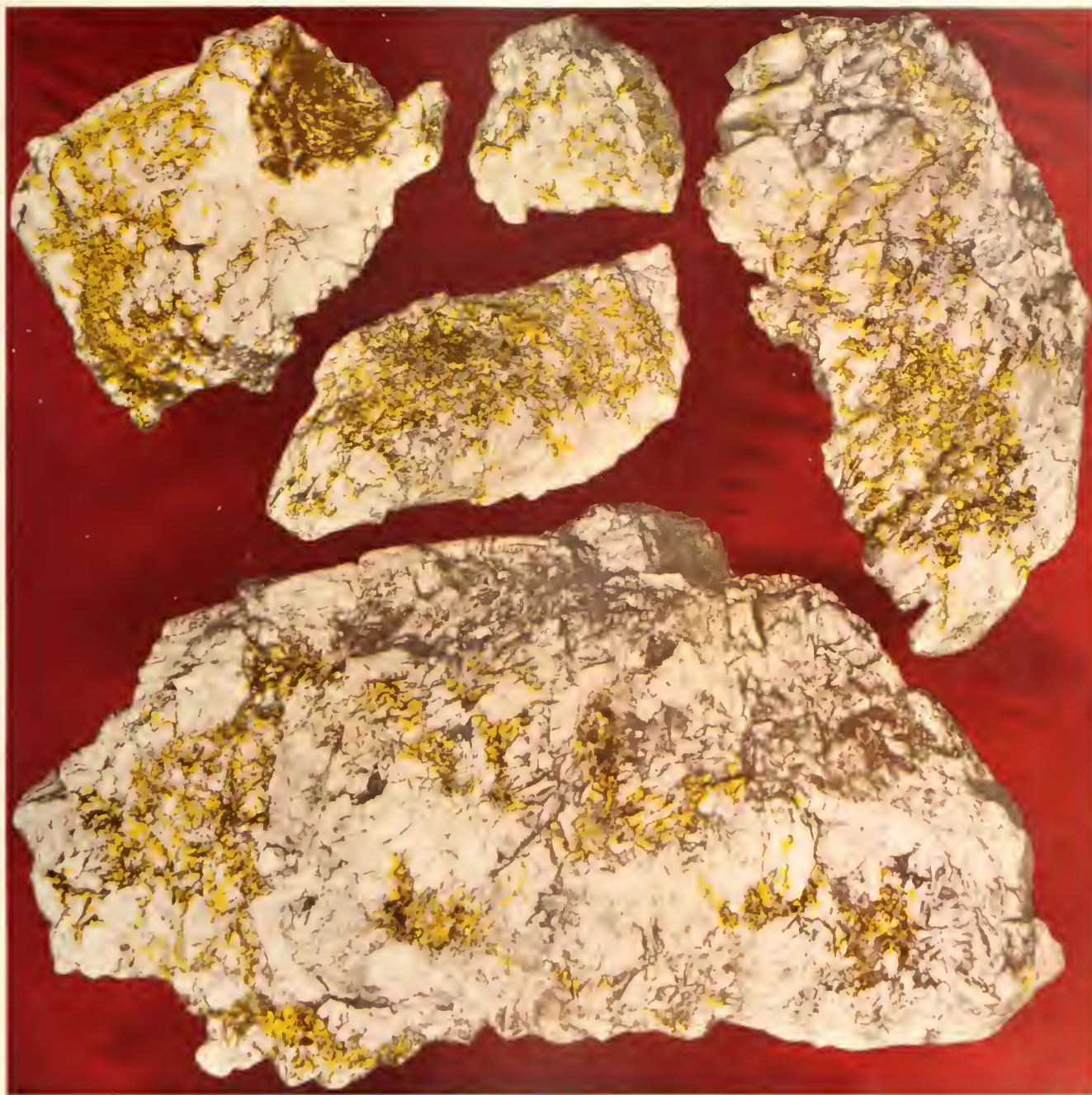


It is not to be imagined that all of the Croesus ore is like these specimens, for the deposits are very pockety. There is, however, a considerable quantity of such rich ore in the vein.

The vein has an average width of 3 ft., and there are values in the wall rock for one foot on each side of the vein. In places serpentine bands cross the vein,

the property and began development work in 1915. The results were phenomenal. A shaft was sunk on the vein and from this shaft above the 100-ft. level \$120,000 in gold was taken out in sinking operations. In a few months about \$1,000,000 worth of ore was partially developed with a small prospecting outfit.

On July 29th, 1916, the plant was totally destroyed



GOLD ORE FROM CROESUS MINE, NORTHERN ONTARIO.

The specimens are much larger than here shown. One of the smaller pieces is shown actual size on the opposite page.

The 5 pieces together weigh about 85 lbs and contain gold and silver valued at \$9,966.

which strikes north and south and dips to the east at an angle of 26 degrees.

The property now known as the Croesus was for some time known as the Dobie-Layson claim. It was considered a good prospect; but little work was done on it until the Dominion Reduction Company acquired

in a disastrous forest fire. It has since been rebuilt and mining and milling have been resumed.

The high-grade ore mined is reduced to bullion in an oil burning furnace. The quartz remaining after the high grade is picked out runs quite high. Mill tests on the decantation process show a 99 per cent extraction.



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practically all wall rock sealed from the walls, and sampling under these conditions was out of the question. However, we were able to sample the top of the stope on the same vein above the 500 ft. level and results so obtained would indicate an average value per ton of 67.1 (sixty-seven one-tenth) ounces. Next we sampled No. 21 stope above the fifth level getting an average grade of 16.9 (sixteen and nine-tenths) ounces.

"The second item listed of 1,405 tons is distributed throughout the mine in small quantities and derived mostly in the work of prospecting old pillars and relatively small shoots of ore. The low grade and quantity of this ore is such as would not warrant the expense of sampling and to it we have attached a nominal value of 8 (eight) ounces per ton.

"The vein matter in the pillar was sampled and results thus obtained, assuming a stope width of 5 ft. would indicate 112 (one hundred and twelve) ounces to the ton of rock broken.

"This work completed, we calculated the tonnage resting above each chute in the first three stopes listed and drew from each chute a proportionate amount of that tonnage (roughly 2 per cent.) thus getting a calculated amount of 194.6 tons. This ore was drawn and hoisted under my supervision. It was first passed over the bumping table, where the crude ore was recovered, and after crushing trammed to the mill and concentrated in the usual manner. The crude ore and dry concentrates were sampled and assayed with the following results:

From Rock House.	High Grade.....	1,691 lbs. at 7,233.3 ozs. per ton	6,115.7
From the Mill.	Jigs.....	408 lbs. at 5,500.0 ozs. per ton	1,122.0
	Sands .....	2,778 lbs. at 2,128.4 ozs. per ton	2,956.3
		736 lbs. at 369.5 ozs. per ton	135.9
	Slimes .....		
	Total recovery. Gross ounces.....		10,329.9

Tons treated—194.6

Average ozs. per ton recovered 53.

Crude .....	31.4
Concentrates .....	21.6

53.

"Assuming for the time being that this figure of 53 represents the average ounces per ton in the first 9,863 tons and that the values of the other reserves listed are as outlined above, we tabulate as follows:

9,863 tons at 53 ozs. per ton .....	522,739
1,405 tons at 8 ozs. per ton .....	11,240
180 tons at 15 ozs. per ton .....	2,700
124 tons at 112 ozs. per ton .....	13,888

11,572 tons containing.....550,567

"Before, however, accepting these figures as final, certain important factors must be noted and given due consideration.

1. Sealing operations have diluted No. 19 stope above the 400 ft. level to an extent impossible to determine.

11. The ounces per ton in crude ore recovered stands at 7,233 whereas the average of crude ore actually sorted out and shipped from this stope approximates 5,000 ozs. per ton. Moreover, of the crude ore recovered (1,691 lbs.) about one-third was contained in three large pieces of very rich vein matter that should possibly be considered as erratic.

111. Information supplied by the management is to the effect that "the No. 19 stope above the 500 ft.

level containing most of the high grade ore was mined the greater part of the way up as a back stope and the high grade ore thus broken, sorted out and shipped. Later, the balance of the stope, possibly 20 per cent. was broken as a breast stope and from this little or none of the high grade vein matter has yet been extracted."

"Under these circumstances the ore now running from the chutes is probably higher in grade by reason of the crude ore contained than the average for the whole stope.

"Hence I believe that the recovery from the crude ore as indicated by mill run is excessive, and could not be safely applied to the whole 9,863 tons. The final recovery from the crude may not exceed 50 per cent. of the figure so indicated, consequently I estimate the probable recovery from the 11,572 tons at from 400,000 to 450,000 ounces gross."

### TEMISKAMING.

There was a fair gathering of shareholders at the special meeting of the Temiskaming Mining Company in Toronto on Sept. 6, and it was evident that the dissentients were of sufficient strength with their accumulated proxies to carry any resolution which appealed to them. The power was not exercised, however, except to amend certain by-laws relating to the registration of proxies and the length of notice required for an annual meeting, which some critics of the administration were inclined to think unduly favored the existing board.

The wishes of the holders of the proxies were also met in the appointment of Douglas Mutch of the Hudson Bay Mine, who will make a third analysis of the property for the benefit of those who desire more information than that provided by the Balmer Neilly report. Another outcome of the meeting was the declaration of a three per cent. dividend payable on October 3.

### CANADA COPPER CORPORATION.

Canada Copper Corporation has developed 10,000,000 tons of ore with 2,000,000 tons additional probable ore, all averaging 1.74 per cent. copper and carrying 35 cents per ton in gold and silver.

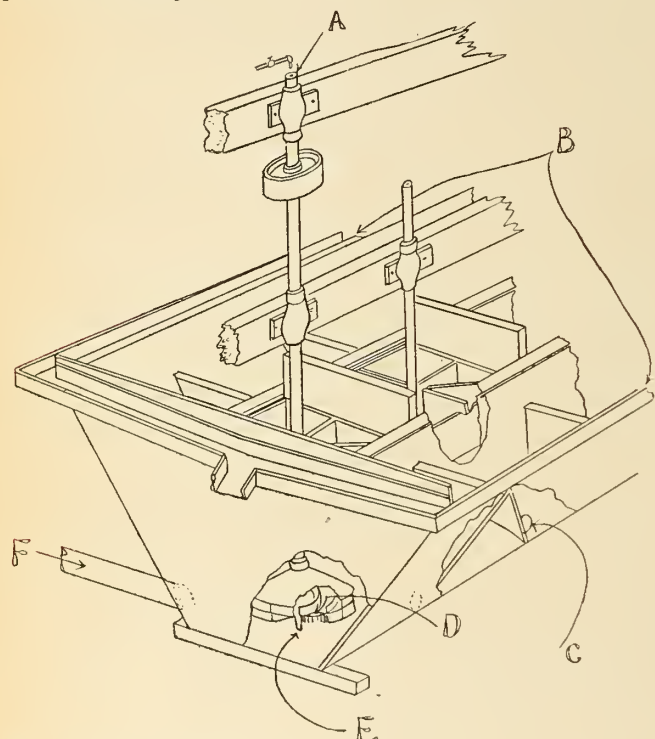
President Mayer estimates that with the treatment of 1,000,000 tons of ore annually the production should approximate 27,000,000 pounds of copper, resulting in earnings of \$1.62 a share on 20-cent copper and assuming all bonds converted. 15-cent copper, on the same basis, should yield earnings of 85 cents a share. He further states that a recovery of 90 per cent. is expected in regular operations through the use of flotation. Actual savings very close to this figure have been made on experimental runs. With operations conducted on the basis of 3000 tons of ore daily the management estimates a cost of 91.2 cents a pound.—Boston News Bureau



### THE GROCH FLOTATION MACHINE.

Mr. Frank Groch, of Cobalt, has been demonstrating at the Toronto Exhibition the operation of the Groch Centrifugal flotation machines, several of which are in use at Cobalt.

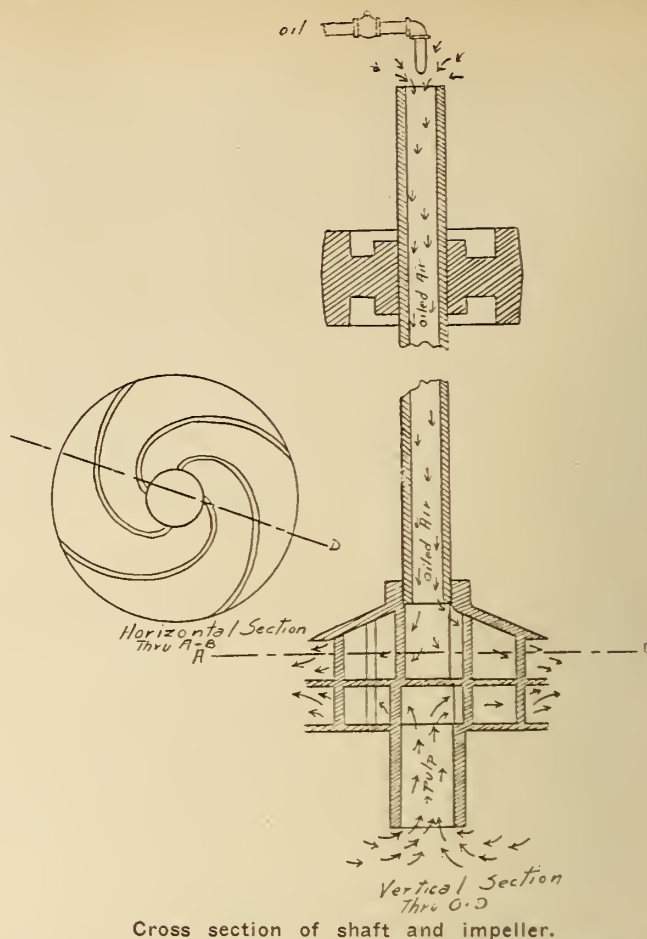
The Groch flotation plant consists of a tube mill for grinding ore and an oil flotation machine for recovering the valuable minerals. The ore is fed into the tube-mill, along with a small quantity of water, by means of a revolving scoop. The actual grinding is performed by steel balls or hard flint pebbles in the cylindrical body.



- A. Suction intake through hollow shaft for air and oil.
- B. Overflow launders to cleaners.
- C. Settled pulp discharged into next compartment.
- E. Pulp drawn through hollow shaft and discharged through impeller.
- D. Oiled air discharged into pulp through upper impeller.
- F. Pulp intake pipe.

From the tube-mill the ground ore in the form of flowing pulp is fed into the first compartment of the Groch Centrifugal Flotation Machine by means of a pipe. Here it is sucked into the lower part of the first impeller. A minute quantity of a light oil is dropped through the hollow shaft of this same impeller and, falling into the upper part of the impeller, is atomized and dispersed through the large volume of air which is sucked down simultaneously through the same channel.

The pulp, and oiled air are ejected together through the impeller at its periphery. During the process, the most easily floated minerals become smeared with oil while the air performs an action similar to that of blowing soap bubbles. The combination of oil, air and mineral then floats to the surface in the form of a scum and overflows to a suitable receptacle. The residue from this first operation is sucked into the second compartment of the Groch Centrifugal Flotation Machine. The system of treatment is repeated in the second impeller using the same or a different class of oil depending on the ease or difficulty with which the remaining minerals may be recovered.



Cross section of shaft and impeller.

By the Groch system of oil flotation it is possible to recover, by preferential selection, various minerals, each in turn, from a complex ore by using different oils or oil mixtures during treatment.

### INTERNATIONAL NICKEL CO.

Preferred and common stockholders of International Nickel Co. are in receipt of notice from voting trustees that voting trust agreement under which preferred and common stock has been deposited since Sept. 6, 1912, has expired. Stockholders are requested to deposit with Bankers Trust Co. their voting trust certificates, for which certificates of stock will be issued.

A publication which should prove of considerable interest to the prospective settler to Western Canada has just been issued by the Natural Resources Intelligence Branch of the Department of the Interior. It is known as the "Homestead" Map and shows graphically the exact location of each quarter-section which is still available for entry under the free Government offer of 160 acres.

### GRANBY IS PROSPERING.

Boston, Sept. 11.—Results of the Granby Consolidated Copper Co. for the past fiscal year will be known to stockholders during the coming month when the annual report for the year ended June 30 last will have been prepared for presentation at the annual meeting in October. It will show earnings of about \$35 per share, against \$9 paid in dividends, as compared with \$25 earned in the previous fiscal period.

Construction and improvement expenditures were heavy during the past year, and these will be continued during the present year. It is not improbable that the fiscal year will be changed to end December 31.

## PERSONAL

Mr. Chas. Boyle, resident manager for the Canadian Klondike Company, has returned to Dawson, Yukon Territory, after having spent the winter "on the outside."

Mr. John Cannon, formerly superintendent of the Consolidated Mining and Smelting Co's No. 1 mine, in Ainsworth camp, British Columbia, is now directing operations in connection with the development of the Lavinia property, situated near the head of Kootenay lake, which the company recently acquired under option of purchase.

Mr. Trevor W. Starkey, of Nelson, B. C., lately contributed to a western mining publication, an article descriptive of parts of the Kamloops-Ashcroft-Nicola country, in British Columbia.

Mr. J. B. Tyrrell, was in the Hazelton region of the Omineca mining division of British Columbia last month. He has returned to Toronto.

Mr. Dudley Mitchell, of Victoria, B. C., instructor in First-Aid and Mine-Rescue work for the Provincial Department of Mines, recently examined six men at Anyox, B. C., who had taken the mine-rescue training course and will now be available for service in the Granby Co's. Hidden Creek mine.

Mr. J. D. Galloway, of Hazelton, resident mining engineer for the northeastern District of British Columbia under the Mineral Survey and Development Act, recently examined quartz properties on Prosperine mountain, in the neighborhood of Barkerville, Cariboo district.

Mr. T. Briggs has been elected president of District No. 18, United Mine Workers of America, in place of Mr. Wm. Graham, last years president. District 18 comprises the larger part of the coalfields of Alberta and the Crowsnest district of British Columbia.

Mr. Geo. O'Brien and Mr. T. H. Williams, two district mine inspectors for the British Columbia Department of Mines, who have been stationed at Fernie, Crowsnest district, have resigned to take other positions. Mr. O'Brien has been appointed superintendent of the No. 4 mine of the Canadian Collieries (Dunsinuir) Ltd., Cumberland, Vancouver island, and Mr. Williams superintendent for the Crow's Nest Pass Coal Company at its Michel colliery, in southeast Kootenay, British Columbia.

Mr. John A. Dawson is in Vancouver, where he has charge of the laboratory of the Inland Revenue Department. An article by Mr. Dawson on the recovery of potash from feldspar, was published in a recent number of the "Canadian Chemical Journal."

Mr. Wm. Green who returned to Toronto last year after being for some time at Ironwood, Michigan, is now on the staff of the Provincial Analyst, Queens Park.

Dr. R. B. Stewart who was for some years connected with the Mining Department, University of Toronto, and who reported on some mining areas for the Ontario Bureau of Mines, has been doing post graduate work at Johns Hopkins University.

Dr. W. G. Miller is visiting mining districts in Northern Ontario. Recent discoveries in Rickard and Thackeray townships, near lake Abitibi will be among the properties examined by Dr. Miller and Mr. P. E. Hopkins of the Bureau of Mines.

Dr. Robert H. Clark, professor of chemistry in the University of British Columbia, was in Toronto last week. Prof. Clark is a graduate of the University of Toronto. He had been in the United States for some years before going to British Columbia.

Mr. H. S. Robinson, manager of the Trethewey Silver-Cobalt mine has been given a three months leave of absence and has left for Washington to enter the training camp for the Officers Reserve Corps.

Mr. J. B. Tyrrell left Toronto on Sept. 5 for Newfoundland. He will examine some mining properties on the island.

Mr. H. W. Baker is visiting mines in Northern Ontario.

Mr. W. E. Simpson is in Toronto.

Mr. W. H. Yeandle is visiting mines in Northern Ontario.

Mr. W. R. Rogers was in charge of the Ontario Bureau of Mines exhibit at the Toronto Exhibition.

Dr. Victor C. Alderson has accepted the presidency of the Colorado School of Mines. Dr. Alderson resigned the position a few years ago.

Mr. Balmer Neilly has completed an examination of the Temiskaming mine.

Lieut. Gwynn G. Gibbons who is reported to have died at Saloniki was, prior to enlistment, on the staff of the Huronian Belt Co. During 1914 he was in charge of an exploration party in the Great Slave Lake district and our readers will recall an account of his trip published in the "Canadian Mining Journal" in March 1915.

Lieut. W. M. Goodwin of Kingston has been awarded the Military Cross.

Lieut. R. R. Rose has been severely wounded.

Mr. Douglas Mutch of Cobalt is to make an examination of the Temiskaming mine.

Mr. R. G. McConnell, Deputy Minister of Mines, is in England.

Mr. C. W. Knight is making geological examinations in the vicinity of lake Wahnapiatae, Ontario.

Mr. Francis A. Thomson has resigned from the faculty of the State College at Washington to accept the Deanship of the School of Mines at the University of Idaho, Moscow, Idaho.

Mr. George O'Brien has been appointed manager for the Canadian Collieries Ltd., Cumberland, B. C.

Mr. W. W. Mein has returned east after examining the great sulphide deposit at Flin Flon lake, Manitoba. Mr. Mein is consulting engineer for the great sulphide company.

Mr. J. H. Black and Mr. Jack Hammel have returned to Toronto from The Pas.

Mr. W. L. Uglow has returned to Canada from Peru.

Mr. H. Webb, purchasing agent at the Hollinger mine, is in Toronto.

Mr. A. R. Globe, assistant manager of Hollinger Consolidated has returned to the mine after a vacation.

Manager Trethewey of the West Dome mine is in Toronto.

Mr. R. Sloan, manager of the Burton-Munro mine and Miss Anna Anchor, daughter of Capt. Anchor, were married in South Porcupine on Sept. 1.

Mr. H. C. Perkins of Washington, D. C., recently visited the Great Sulphide property at Flin Flon, Manitoba.

Mr. "Karrie" Davies of San Francisco has returned to New York from Northern Manitoba.



## Special Correspondence

### NORTHERN ONTARIO.

#### Tretheway.

The shaft on the property in the township of Cane, which was being opened up by the Trethewey Mining Company of Cobalt has reached a depth of forty feet. The vein on the surface was composed of aplite and contained considerable leaf silver over a width of several inches; but it narrowed down to only a seam and the values are considerably lower than at the surface. On the south claim of the group there is a shaft some fifty feet in depth, which was sunk on a strong vein which carried good silver values. At the forty foot level this vein dipped out of the shaft. The Trethewey management drove a short crosscut at the present level of the shaft and tapped the vein to determine its value. Results were not encouraging and it is understood operations have been discontinued.

#### Big Profits for Kerr Lake Co.

Indications are that the past year will show the highest profits in the history of the Kerr Lake mining company. The production of silver during the past year was in the neighborhood of 2,600,000 ounces, which will constitute a new high record since 1910. When the high price of silver is taken into consideration the profits will show a considerable increase over those of that year.

#### West Dome Ore Reserves.

The statement of the management of the West Dome Consolidated is a very gratifying one. The item of most importance is that of ore reserves the total estimate of which has an estimated gross value of over \$2,000,000 blocked out. The possibilities of adding greatly to this ore reserve as development progresses is considered to be good. The grade of ore varies between \$6.17 and \$8.00 per ton.

#### Kirkland Lake.

The downward continuation of the Kirkland Lake Gold vein has been encountered at the 700-foot level, and the general appearance of the vein matter leads to the belief that the average gold content will prove similar to that opened up on the upper levels of this property. The determining of good ore at this depth, which is the deepest working in the Kirkland Lake camp verifies the convictions of mining men that the area will ultimately prove to carry values to a great depth. Developments at this property have a more or less definite bearing on the whole camp.

#### Fidelity Mining Co.

Encouraging results are being met with on the claims owned by the Fidelity Mining Company in the Goodfish Lake portion of the Kirkland Lake Gold area. Work was started only a short time ago and is being pushed ahead vigorously.

#### Activity in Many Gold Areas.

Active gold mining operations are being conducted at a greater number of points throughout the North Country than ever before in its history. In order of importance these districts may be mentioned as follows: Porcupine, Kirkland Lake, Munro, Boston Creek, Larder Lake, Tashota, Bourkes' Siding, Seseikinika, Fort Matachewan, West Shining Tree, Kamiskotia, Kowkash, Thackeray, etc. The Goodfish Lake District and the township of Gauthier are generally referred to as being in the Kirkland Lake belt and are looked upon as very promising fields, although slightly removed from the Kirkland Lake field proper.

#### Improving Roads in Deloro Township.

The road from the Dome Mines south to the Ankerite property has been graded and the transportation of machinery and supplies will be greatly facilitated to properties in the township of Deloro. From South Porcupine to the Dome Mines one of the best roads in the north country is to be found, and with the addition of this new portion to that road the district around and south of the Dome Lake is now reasonably accessible.

#### Good Ore on Wright Hargraves.

The main shaft of the Wright-Hargraves at Kirkland Lake has reached the 300-foot level. Where cut at the 300-foot level the vein is running very consistently and the ore is of a good grade. Lateral work will be undertaken as soon as the 300-foot level station is completed and it will then be possible to estimate on the value of the ore reserves. This property is considered to be one of the most promising in the Kirkland Lake district, and in the near future the management will be able to deal with ore reserves in their relation to the intrinsic value of the mine, instead of probabilities.

#### Ore Encountered on Buff Munro.

At the Buff Munro property in the township of Munro a shaft has been started and at a depth of about 20 feet some very high grade ore has been encountered. So far the work has been done with hand steel, but it is expected that a small steam plant will be installed in the near future. The Buff is situated just one mile east from the famous Croesus property.

#### Canadian Kirkland Lake.

Seventeen promising veins have been uncovered on the property of the Canadian Kirkland Mining Company in the Kirkland Lake district and on two of these veins the assays are said to range around \$6 to the ton and a number of other veins are said to contain very fair values. Development work consists chiefly in the opening up of the vein systems on the property and the sinking of test pits wherever promising ore is encountered. Tenders have been asked for the necessary plant for the development of the property at depth and this plant will likely be in full operation in the course of the next few months. Considering the amount of development work that has been accomplished on this property the results are highly encouraging.

#### Ore Claims Sold.

The first cash payment on a deal for the Orr Gold Mines Limited and a group of six claims belonging to Saul Renaud and his associates, which lie a short distance south, has been made. The new company will control nine claims comprising an acreage of upwards of 300, on which it has been demonstrated that ore of a commercial character occurs. The north claim of the Orr group lies immediately adjacent to the Teek Hughes property. The Kirkland Lake Gold main ore body crosses the north-west corner of the Orr.

#### Underground Work Resumed at Schumacher.

Underground work and milling operations at the Schumacher mine in Porcupine which were recently resumed after a temporary shut down to aid in the construction and repair of the milling and mining plant of the company are now in full swing. The capacity of the mill has been increased considerably and when the program of construction is complete will be the fourth largest mill in the Porcupine district and will have a capacity of about 300 tons per day. The underground workings of the mine were also thoroughly gone over and many improvements effected which will greatly facilitate the handling of the ore. The grade of ore which has been encountered at the lower levels of the



mine is considerably higher than that on the upper levels and like that of the other mines in the immediate neighborhood, (The Hollinger and the McIntyre) is more consistent in width and volume at the lower levels than above. It may reasonably be expected that the conditions on the Schumacher will be found to coincide with that of the McIntyre, where the best values began to be encountered at the seven hundred foot level and have continued to a depth of over 1,000 ft. where a very large drift has been run in good ore to connect the three properties belonging to the McIntyre company. The present main shaft on the Schumacher will be sunk to the 1000-foot level and the No. 4 shaft which is some 1400-feet east will be sunk to the 400-foot level, where the ore zone lying to south of the present main shaft will also be developed underground. This portion of the company's property has hitherto never been developed underground.

#### **Increasing Hollinger Production.**

It is unofficially stated that during August the production at the Hollinger mine will beat all records in the history of the company. Working forces are becoming more satisfactory both in numbers and efficiency, and it is considered probable that the new milling facilities will be pressed into service before long. Were the mill at the Hollinger to be pressed into service at full blast the monthly tonnage would amount to approximately 48,000 tons and would result in the recovery of something like \$480,000 annually, this extraction would amount to around \$10,080,000 of which nearly half of this \$10,000,000 output would be gross profits. This, of course is based on previous Hollinger performances and taking into account the completion of the new milling equipment and the operation thereof. It is considered highly probable that dividends will be resumed before the end of the present year.

#### **Minaker to Install Machinery.**

Plans have been made for the installing of mining equipment on the Minaker-Kirkland of sufficient capacity to carry development work to the 200-foot level, and will permit of more rapid development than by the use of hand steel. Developments on the Minaker have been conducted chiefly on the surface except for a number of test pits the deepest of which has been sunk forty feet. The latter pit is on the vein discovered last spring on the North claim of the property and runs onto the property from the Lake Shore mine. The work so far done has given sufficiently encouraging results to warrant the installation of more powerful mining machinery.

#### **Building Mill at Lake Shore.**

The work of building the foundations for the new 80-ton mill at the Lake Shore mine at Kirkland lake is well under way and the building will be completed before the winter sets in. It is expected that the plant will be treating ore during the early part of the coming year. The main workings of the mine have been carried to a depth of three hundred and seventy feet and will be continued to the 400-foot level, where a cross-cut will be run to tap the vein which was encountered at the 200-foot level early this present summer. When the vein is tapped a raise will be put in to connect the working with the drift on the 200-foot level. Development work will also be carried on at the 400-foot level on the No. 1 vein system or the main workings of the property.

#### **To Ship From South Lorrain.**

It is anticipated that the Pittsburgh-Lorrain situated in the old South Lorrain district will ship a car-load of high grade ore early this fall. The Pittsburgh Lorrain has taken over the old Wettlaufer mine and mill. The mill has been overhauled and is now in operation on

the treatment of the low grade ore developed in the course of taking out the car-load of high grade ore which is nearly ready for shipment. The ore on hand is thought to be sufficient to keep the mill operating for the balance of the present year when the mill will probably be closed down pending the probable tonnage that will be available for treatment in the spring from the aggressive mining development which will be carried on during the winter months, which should permit of the resumption of milling operations on a permanent scale by spring. The high quotations for bar silver should eventually lead to much activity in the once famous South Lorrain area.

#### **Mr. Neilly's Report on Temiskaming.**

The special Temiskaming report issued by Mr. Balmer E. Neilly, manager of the Penn-Canadian mine, on the request of Mr. Max Morgenstern, corresponds very closely with that of the management of the mine, which was issued recently. The report shows that from 400,000 to 450,000 ounces of silver is positively in sight, and lays considerable emphasis on the fact that the estimate deals only with positive ore, leaving room for estimates of probable and indicated ore. With silver selling at a figure close to a dollar per ounce the ore actually in sight at the mine has an estimated value of close to \$400,000.

#### **Peterson Lake.**

The quarterly report of the Peterson Lake Mining Co. recently issued over the signature of S. G. Forst shows the company to have cash in the bank of \$43,122. A small amount of ore is also on hand. It is also estimated that the mill residues and dumps on the property contain ore of a value of three hundred thousand dollars. The litigation with the Dominion Reduction company for the residues in Peterson lake valued at over \$1,000,000 is still in the courts. So far the development work on the Susquehanna section of the property has failed to produce ore in paying quantities, although numerous small pockets have been discovered. The report states: "From information obtained from several prominent mining engineers, the writer is of the opinion that but a small portion of your property has been properly prospected and is one of the best undeveloped sections of the Cobalt camp, and that the possibilities for same again becoming a heavy shipper are very promising."

#### **Seven Oil Flotation Plants at Cobalt.**

The oil flotation process for the treatment of Cobalt ores is now generally considered to be a success. This however, does not mean that the older standard methods of concentration will be displaced, but it does mean that it will now be possible to treat ore of a lower grade than was hitherto practicable. Seven companies in the camp have installed oil flotation plants and the daily capacity is upwards of 2,200 tons.

#### **Portage Bay.**

It is anticipated that the new record price for silver will lead to the active development of the Portage Bay district where numerous veins carrying considerable cobalt, and in a number of places small silver values, are in evidence. Up to the present time no deep mining has been attempted at Portage Bay with the result that the values which lie at depth remain still to be proven.

#### **A Second Flotation Plant for McKinley Darragh.**

Within the next week or so the new oil flotation plant at the McKinley-Darragh mine, which is now practically installed, should be in operation. This new addition to the mill equipment of the mine should add considerably to the output of silver from the property. The McKinley-Darragh was the first mine in the camp to use the



flotation process of treatment, although the Buffalo mines was the first to commence the installation of a plant. The process has proven highly satisfactory as is evidenced by the fact that this second large plant is being installed.

#### BRITISH COLUMBIA.

At the time of writing mining matters are steadily settling down to a condition of general activity, but time alone will tell whether or not there will soon again be an interruption to progress. The unexpected has happened so many times, that it does not seem safe to make predictions. There are rumors of what miners, especially coal miners, will do ere long in retaliation for the passing of a prohibition law, but whether anything more serious than talk will result remains to be seen. There does not seem to be any room for doubt, though, that many men resent the interference with their liberty, and on the Coast there is certainly an undercurrent of dissatisfaction with the result of the efforts of "slackers and religious fanatics," as is freely alleged, but whether any concerted action will be taken by the dissatisfied ones can not at present be forecasted. It is earnestly hoped, though, that there will not be any renewed interruption to mineral production, but that a return to normal output conditions will be experienced.

Just now it can be stated that there has been satisfactory progress in recent weeks. Copper blast-furnaces have been blown in at Trail, Grand Forks, and Greenwood. More miners have been employed and more ore is being produced and shipped. The production of coal is getting back to what it was before labor difficulties in the interior seriously checked the output. The total production for seven months to the end of July is reported to have been between 1,300,000 and 1,400,000 long tons gross, that is including coal made into coke and that burned under colliery boilers, etc. These figures show an increase for Vancouver Island coal mines, but there has been a considerable loss of production from Crowsnest collieries, so that it is not unlikely the total output for the year will be less than that of last year. If men were available, there could be a much larger output made, but they are not, and the result is that the Coast collieries can not fully fill orders obtainable, while the interior coal operators are not much, if any, better off in regard to getting more miners and other workers for their mines.

Ore production at mines in Rossland and Boundary camps is now larger than for several months. There seems also to be a general increase in output from mines in Ainsworth and Sloean divisions, while the Sullivan mine, in East Kootenay maintains its large output of lead and zinc ores. On the Coast, too, matters seem to be progressive. Some notes follow relative to mines in the Coast and tributary districts that have not generally been given in this correspondence as much notice as they should have.

#### Omineca.

Mining is making progress in the western part of Omineca mining division, in regions tributary to the Grand Trunk Pacific railway. The most productive and important mine in this division is that of the Rocher Debole Copper Co., situated on Rocher Debole mountain.

In his official report on the Hazelton-Telkwa district, in Omineca division, published in the 1916 Annual Report of the Minister of Mines for British Columbia, the Assistant Mineralogist gave the following introductory information when describing properties on Rocher Debole mountain:

"The name 'Rocher Debole camp' may be restricted to mean that piece of country surrounding the head of Juniper Creek and its small tributary, Balsam creek. It includes the Rocher Debole mine, Great Ohio, Highland Boy, Delta, and Red Rose group, beside many less well known mineral claims. The Hazelton View group and other claims controlled by the New Hazelton Gold-Cobalt Company, are situated a short distance over the ridge of Rocher Debole mountain from the mine of the same name, but they are reached by means of a trail starting from Carnaby, on the Skeena River side of the mountain. (Note—Carnaby is on the Grand Trunk Pacific railway, seven miles eastward from Hazelton).

The Rocher Debole mine still continues to hold its place as the most important mine in the Omineca mining division. It was worked steadily during 1916 and while a considerable quantity of ore was shipped, at the same time development work was pushed ahead. The lease under which the Montana Continental Development Company commenced to work the mine in August, 1913, ran out in February, 1916, and since the latter date operation of the mine has been in the hands of the original company—the Rocher Debole Copper Company. During the tenure of its lease the Montana company developed the mine from a prospect; equipped it with a hydro-electric plant, compressor, surface and aerial tramways, and much incidental machinery, ore-bins, buildings, etc., and shipped ore to the value of about \$700,000.

"When the situation of the property is considered, its high elevation (4000 to 6000 ft.) with workings above timber-line, the long severe winter weather to be contended with, and the usual difficulties of opening a mine in a new camp and a new country this record, attained in thirty months, stands as testimonial to the ability, energy, hard work, and initiative of the manager, Mr. D. J. Williams."

In his report for 1915, the district Gold Commissioner stated that from May 17 to December 12 of that year, 17,000 tons of ore was shipped from the Rocher Debole mine to the Granby Co.'s smelting works at Anyox, Observatory inlet, this ore averaging about 8 per cent copper and \$1.65 in gold and 50 cents in silver to the ton. Elsewhere in the Annual Report for that year it was stated that the ore shipped contained 2,788,000 lb. of copper. Later official comment was: "When it is considered that, mining in this way and shipping without hand-sorting, a large amount of waste rock necessarily is included in the ore, it is evident that the shoots of clean ore contain a high percentage of chalcopyrite. The production for 1916 was 16,800 tons, containing 1200 oz. gold, 16,700 silver, and 1,619,145 lb. copper (recovered copper) "

Since the official reports, above quoted from, were made, ore has been encountered in lower levels of the Rocher Debole mine, and in sufficient quantity to give promise of much production in the future, and, too, encouraging owners of other properties in the same camp to push on with development work and prepare for ore-shipment after transportation facilities and ore-handling equipment shall have been provided.

Various other mining camps also in the western part of Omineca division are worthy of notice, especially those on Glen mountain and Nine-mile mountain, both in the neighborhood of Hazelton, and in which silver-lead-zinc ores occur. Information published in the 1916 Annual Report is to the effect that there was shipped in 1916 from the Silver Standard mine, on Glen mountain, 651 tons of silver-lead ore, containing 126



oz. gold, 74,593 oz. silver, and 162,051 lb. lead; also 209 tons of zinc-silver ore containing 168,616 lb. zinc and 12,647 oz. silver. A concentrating plant is being put in for treating ore of a milling grade from this mine.

Just one more property will have brief notice at this time, namely the Santa Maria group, in Howson basin. The Assistant Mineralogist in notes introductory to his account of Howson basin stated that: Howson basin is situated at the head of Howson creek, a tributary coming in from the west to the south fork of the Telkwa river. It is distant about 28 miles from Telkwa (Telkwa station is 59 miles from Hazelton and 236 miles from Prince Rupert along the Grand Trunk Pacific railway), and is reached by a trail following up the main Telkwa river and then the south fork of that river to its headwaters." Considerable progress has been made since the Assistant Mineralogist investigated the property for his last year's report on it. In that report he mentions a fairly well-defined vein averaging about four feet in width, and that chalcocite is the most important mineral found, but other sulphides of copper and of iron also occur. A sample across four and one-half feet of the vein, taken from 35 ft. down the shaft, assayed: Gold, trace, silver, 7.5 oz.; copper, 12.3 per cent. From the material taken from the shaft about 50 tons of good ore had been hand-sorted and piled on the dump; a grab sample of from 35 ft. down the shaft, assayed: Gold, trace; silver, 13.2 oz.; and copper, 21.7 per cent. Since the report was written it has been ascertained that during the winter of 1916-17 247 tons of ore was shipped to the smelting works at Anyox, this ore averaging about 18 per cent. copper and 11 oz. in silver to the ton.

#### Coast.

Apart from the far-and-away more important operations of the Granby Consolidated Company its Hidden Creek mine and its smelting works at Anyox, Observatory inlet, the most noteworthy mining news from the upper Coast district is the report that the Engineer gold mine, in Atlin mining division, "has been sold for a sum which reaches seven figures," and that "if the report be true it means that several hundred men will be employed in development work." As, however, there has in the past been much talk about the great things to be expected when this property should be sold, it will be well to wait until the suggested much larger activities shall have become accomplished facts.

A more important evidence of progress is the approaching completion of the gold-saving mill the Belmont-Canadian Mines, Ltd., has been erecting and equipping for treatment of ore from its Surf Inlet gold mine, in which that company has during the last two or three years done much important development work. Surf Inlet is on Princess Royal island. The Belmont Canadian Mines, Ltd., is understood to be a subsidiary company of the Tonopah-Belmont company, operating in Nevada and having among its principal shareholders residents of Philadelphia. The district mine inspector in his last annual report mentions the occurrence on this company's property of a series of lenticular masses of white pyritiferous quartz containing gold, with smaller value in silver and copper. The mine is situated seven miles inland from the head of Surf Inlet, at an altitude of about 1,000 ft. So far three distinct lenses of ore have been developed to a depth of 1,000 ft. vertically from the outcrop, and more than 13,000 ft. of drifting has been done. In connection with the hydro-electric power system being

established, a hollow concrete dam 490 ft. long and in places 75 ft. high, has been built across the lower end of one of a series of lakes. An incline has been constructed from the wharf at the head of the inlet to the top of the dam, for transference of materials from tidewater to barges on the lake, whence there will be a water route to within a mile and a half from the mine, and this latter distance is covered by tramway to be electrically operated. The hydro-electric power station, a concrete structure, is near tidewater; its equipment provides for generating 1500 h.p., with a water-head of a little more than 50 ft. The mill and concentrating plant will have a capacity of more than 250 tons, with provision for increase to 500 tons. Machine shops will have power tools to be operated by electricity. At the mine besides the necessary mine buildings there will be accommodation for employees—between 200 and 300 in all.

#### NEW YORK WANTS CONTROL OF THE SILVER MARKET.

Boston, Aug. 28.—London has for years been recognized as the silver market of the world. So it was with copper until after the outbreak of the war, but determination of the price of the latter metal has found lodgment where it belongs,—with the American producers who supply the greater part of the world's needs. The point arises: Can control of the silver market be lodged in New York, the headquarters of the principal silver producers of the world?

The representative of one of New York's leading silver firms says: "Great Britain controls the silver market through domination of purchases for a very large part of the present yield. All of India's requirements are handled through London, and, as is generally known, the Far East, including China and India, are the greatest consumers of silver for mercantile purposes.

"A few weeks ago, it may be recalled, when silver commenced to soar in price after a lull, London sought to put a damper on bullish enthusiasm by declaring an embargo on silver imports into India without official sanction from the British government. This was the answer to an extraordinarily heavy movement from the United States and Canada via Pacific ports direct to the Far East. A slump in prices then followed, but a subsequent recovery has carried silver to new high levels.

"Merchants in this country with remittances due the Far East were requested to make no further payments in silver as a part of this program of restricting the Pacific movement.

"You ask if this movement has been stopped. I cannot answer directly, but it is known that the movement of silver to San Francisco is still heavy, and such a movement is obviously for a single purpose."

The United States government has been buying silver very heavily during the past few months for coinage purposes and wants more. England, it is pointed out, might withdraw from the market temporarily in an effort to depress silver prices, but such withdrawal could only be temporary.

The belief exists in some well informed quarters in the silver producing industry that to New York by virtue of its control of production belongs the duty of making the silver market, and such an attempt, which was started some weeks ago, would doubtless be pushed should the British government undertake to regulate the price of this commodity.—Boston News Bureau.



**SCHUMACHER GOLD MINES LIMITED.**

In a letter, dated Aug. 30, to the shareholders of Schumacher Gold Mines, Limited the directors say: The mine has just been reopened after a shut down of 51 days. For some time previous to the closing down of the mine it had been apparent that it would be necessary to cease operations at some time in order to make numerous changes and repairs which they deemed necessary to put the mine in first-class working condition. In June a crisis arose in the labor situation in the Porcupine Camp, there being much talk of a strike by the men and rumors of a contest for men between several of the larger mines in the camp. The directors decided this was an opportune time to temporarily close down the mine and effect the much needed improvements they had in mind. Accordingly mining operations ceased about the end of June and the staff was reduced to the minimum necessary requirements. Underground work was not resumed until the 16th inst., and the mill was not again running until the 20th inst.

In the interval the following improvements were carried out, namely: In the mine the track on the first three levels was taken up and relaid to a standard gauge and the cars were likewise adjusted and repaired. The advantage of this one change can be easily understood when it is known that with the tracks and cars in their present condition a car can be trammed by one man, while formerly two men were necessary for each car. The drilling machines were all overhauled and put in good shape, and the underground was made ready for winter. In the mill, the floors were cleaned, the tanks emptied and cleaned, and all valves precipitated. The Hardinge mill was relined and thoroughly overhauled, and the pumps were repaired, the clarifier lowered to meet the requirements of a new flow sheet, new belts were put on to replace the old worn-out ones, the old agitators were taken out and new ones installed, and the mechanisms of the old agitators were fixed to fit larger tanks which were installed in order to increase the capacity of the mill. On the surface the steam lines were all taken up and relaid with proper drainage and protection from frost, which last improvement will mean a considerable saving of coal throughout the winter months. The mill launder was cleaned, a new section pipe put on the lake pump and a new electric sub-station erected and fitted up and a new transformer and compressor installed. This last mentioned machinery addition will increase the drill capacity from 14 to 25, which means that a more aggressive development policy can now be carried on.

The work on the new mill addition is proceeding very satisfactorily and should be completed in a few weeks. Now that the first unit of the mill has been so completely overhauled and new tank capacity added, it is expected that 150 tons per day will be handled almost immediately, which will be increased to 180 tons as soon as the new tanks now in course of erection are completed. With the new compressor installed and our capacity brought up to 25 drills, this will enable us to block out a great deal of ore. When this is completed then all that remains for us to do will be to install one Hardinge mill and one tube mill to bring the mill up to 300 tons daily capacity, which will make the mill the fourth largest in the Porcupine Camp.

While bullion production has been gradually increasing during the period just prior to closing down, costs therewith were necessarily increasing and at the time we closed down we were forced to mine \$10 and

\$12 ore in order to meet these high costs. Now with these additions and improvements hereinbefore mentioned, we can mill much lower grade ore and mill it at a profit, which means that your property can be mined and not stripped.

From developments made by the Hollinger and McIntyre companies, which adjoin the property, it is evident that values in this section of the Porcupine Camp continue to great depth, and we therefore decided upon an aggressive development program and intend to sink the present main shaft from its present level of 600 feet to a depth of 1,000 feet, and also to sink number 4 shaft, which is some 1,400 feet east of the main shaft, to a depth of 400 feet. The known ore zone lying south of the present main shaft, which has never been developed underground, will also be developed.

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**THE COBALT PROVINCIAL MINE.**

An interesting account of the early history of the Cobalt Provincial mine which is to be reopened, is given in a market letter recently published by Mark Harris & Co. Mr. Harris says in part:

The Cobalt Provincial is one of a number of valuable mining properties in the Cobalt camp which were not staked out by prospectors during the early rush, but which were for various reasons held by the Government and later on sold at public auction, at which they commanded a high price owing to their proximity to some of the big producers of the camp.

The Provincial lies right along the line of what is known as the Gillies timber limit, a tract of land lying on both sides of the Montreal River and about 100 square miles in extent. This limit was not thrown open for prospecting, the reason being that it contained a large quantity of green pine, the owners of which were apprehensive lest fire should be introduced if prospecting and mining were permitted. The northern apex of this tract penetrated like a wedge into the Township of Coleman to a short distance south of Cobalt Lake, and was, therefore, geographically within the favorable area for the occurrence of minerals.

In the spring of 1906 it was decided to prospect and work the mineralized portion of the Gillies limit on Government account, and the Ontario Legislature approved of the proposal and granted the necessary funds. Professor Willet G. Miller, the provincial geologist, took charge of operations.

The first real discovery in the Gillies timber limit was made on what is now the Cobalt Provincial on July 19, 1906, when a fine seven-inch vein carrying smaltite and niccolite, accompanied by a profusion of native silver, partly in sheets and nuggets and partly disseminated in smaller particles throughout the vein matter, was uncovered. Very little actual mining work was done that year, the balance of the period being taken up with carrying on surface prospecting and trenching, while at the same time the entire northern part of the limit was surveyed and mapped out.

Little progress was made at the Provincial in 1907 owing to the failure of machinery companies to deliver plant according to contract, and to the labor difficulties in the Cobalt camp. Furthermore, construction work on the Kerr Lake branch of the T. & N. O. Railway, which passed within 200 feet of the mine buildings, retarded operations considerably, as these could only be carried on with jeopardy to the lives of the workmen.

Mr. E. T. Corkill, then Inspector of Mines, was as-



sociated with Prof. Miller in the management of the Provincial, which went on a producing basis in 1908. In all two shafts were put down and a comparatively small amount of lateral development work carried on at the first two levels. Shipments from the property that year comprised one carload, 48,625 pounds of silver ore, and two carloads, 92,103 pounds, of cobalt ore, the proceeds from which were \$12,317.

The mine was worked by the Government until September, 1909, when it was put up at public auction and sold for \$113,111 possession being given to the new owners on Oct. 6, 1909. The reason for the sale is set out in the Ontario Bureau of Mines report, Vol. 19, Part 1, as follows:

"It was one thing to work a rich deposit of ascertained value, and quite another thing to adventure the funds of the Province with results which might be satisfactory or might be unsatisfactory—even such chances as a private company risking its own capital might deem itself in every way justified in taking. In short, while quite willing to work the mine for the benefit of the treasury if it had turned out to be a bonanza similar to some of the well known Cobalt mines farther north, the department did not deem it desirable to speculate with the Province's funds, notwithstanding the fact that the Legislature had placed them at its disposal."

The purchasers of the property incorporated a company, the Cobalt Provincial Mining Company, Limited, thereby retaining the name which had been given to the holding by the Government. Work was carried on in a small way and ore shipments were made at recurring intervals, the total production since incorporation amounted to approximately 140,000 ounces of silver. The decline in the white metal to below fifty cents an ounce, however, made it impracticable to work the mine at a satisfactory profit, and on that account, in common with many other one time prominent holdings, the Provincial was shut down pending a return to normal conditions in the silver industry.

### DOLLAR SILVER IN SIGHT.

Dollar silver is in sight, according to officials of mining companies contributing in substantial amounts to the world's supply of this metal.

The president of an active silver producer says in a Boston paper: "The world is clamoring for silver and there is not enough to go around. This shortage—for it is nothing else—means higher prices.

"Practically every government is coining silver as never before; the Far East, always a big consumer, is looking for large quantities and the leading nations of the world, all at war, are in need of silver for coins to be used in paying their troops.

"Mexico, an important producer, is doing very little in comparison with its former yield. Cobalt is falling behind for the demand upon Canada's man power to enter the army long ago made itself felt in a scarcity of labor north of our border.

"And to cap the climax there must be considered the strike among the western copper mines, practically all of which are producers of silver as a by-product.

"Never in my recollection has the situation in silver been so acute. For every ounce above ground there is a strong demand. Shipments are again being made to London, notwithstanding the high cost of transportation and the additional war risk."—Boston News Bureau.

### MEN NEEDED FOR THE MINES.

Commenting on the labor situation the "Cobalt Nugget" says:

Despite the constant drain on the country's man power due to war, working forces at the producing mines of Cobalt continue comparatively satisfactory, while at Porcupine, and Kirkland Lake, a more or less steady improvement is being recorded.

Up until very recently, production of munitions of war in other parts of the country together with the extensive demand for labor on the farms was at a maximum. Now, however, from many parts of the country come reports that hundreds or even thousands of munition workers are being laid off. Also, the harvesting of the bountiful grain crop in all parts of the Dominion is now in its advanced stages and within the next few weeks thousands of harvesters will probably be seeking employment in other lines of industry. No doubt the application of conscription will consume a large portion of any surplus man-power that may ensue, but there would appear to be very little doubt but that the mining industry with its attended high average rate of remuneration, will attract fairly large numbers of men to this district. The high price of the white metal is a spur that is ever urging the silver mine operators of the country to greater and greater efforts to increase the output, with the result that net earnings compare very favorably with the banner months or years since the beginning of mining silver from the mines of Cobalt. With quotations for commercial bar silver advancing steadily toward the dollar mark, there will be no let up to the impetus with which operations are being conducted. This is a guarantee that the mine workers will receive high rates of pay, shareholders of the various producing companies will receive handsome dividends, merchants will experience a marked falling off in "bad accounts" and business in general should be elevated to a new concrete plane.

The producing mines at Porcupine, Kirkland Lake, and Munro are in greatly improved physical condition. Ore reserves of the gold mines are greatly in excess of any previous year in the history of gold mining in Ontario. Were the release of munition workers and farm labor to result in say only two thousand mine workers finding their way to the gold mines of the country, which is now believed not improbable, the time for a general return to a dividend paying basis by the leading companies of the camp which have temporarily suspended profit disbursements would not be long.

### ASBESTOS FROM NORTHERN ONTARIO.

Some samples of excellent asbestos from Deloro township, Ontario, were shown in Toronto at the Exhibition last week. Quebec is the asbestos producing province and these specimens were from Ontario's first producing mine. There is a good demand for asbestos and Quebec mines are very busy this year.

The lack of appreciation of the problems of the mineral industry displayed by members of the House at Ottawa, emphasizes again the need of the presence of a Minister of Mines at committee meetings affecting the mineral industry. There should be at least one well informed man in a position to explain the government's proposals and to lend some degree of understanding to debates on subjects relating to the development of our mineral resources.



### THE BUFFALO SILVER MINERS' GARDEN.

An interesting account of the interest taken by mine managers and employees in food production this year is given by E. A. C. in the September number of the C. M. I. Bulletin. The following is an account of the plan adopted by Buffalo mines.

"Up at mileage 104, north of the road leading to the old King Edward, is a fine area of tillable land known as the Watash mining claim. The manager of the Buffalo mine, Tom R. Jones, saw here a chance to garden on a fairly large scale. His first step was to organize the Watash Farmers Association from among the mine employees. Every employee is eligible for membership and the only expense for which the members are liable is the cost of keeping one man at work on the farm for a specified time throughout the summer. There were a few stumps in one corner of the area; but these presented no difficulty to Captain McAllister and his crew of miners. Stumps are easily dislodged by the judicious use of 25 per cent. powder, so with a case or two of 50 per cent. the miners blew them twice as far as was perhaps needful. The land was prepared and all the seed purchased by the company.

"Each member is required to do 50 hours work during the summer, and his interest is negotiable and may be sold to any other employee. In July there were 57 working members, divided into squads each with a duly appointed leader. In order to facilitate the work a 15-passenger car is provided for the free transportation of the members. The driver being also a member, collects no fares but will share in the fall 'clean up.'

The miners planted 240 bushels of potatoes, 2000 brussels sprouts, 10,000 celery plants, 5500 cabbage plants, 650 tomato plants, and over four acres of turnips, parsnips, beets, carrots and other vegetables. The men are intensely interested in the scheme. So is the manager who when practicable visits the farm daily. A notice posted in a conspicuous place sets forth that the products of the farm will be divided in proportion to the size of the family of the members participating.

"I asked Tom Jones to estimate the probable crop yield. He answered in characteristic fashion, that if a kind providence would continue to send the sunshine there would be no hungry children in Cobalt this coming winter and that after the harvest the camp would be in a position to supply some outward freight, in form other than silver bullion and concentrate, for the T. & N. O."

### ONTARIO BUREAU OF MINES EXHIBIT.

The Ontario Bureau of Mines, as usual, had an excellent exhibit at the Exhibition in Toronto this year. New features that proved very attractive were a Groch centrifugal flotation machine and a model stamp mill. The miniature mill was constructed by Mr. J. N. Evans of Belleville. The flotation machine which is described elsewhere in this issue of the "Journal," was operated by Mr. Frank Groch and Mr. W. E. Simpson. These gentlemen had an interesting time explaining the principles of the machine.

Excellent samples of molybdenite from Eastern Ontario attracted considerable attention. Ferro molybdenum which is now being manufactured at Orillia and Belleville and stellite, the cobalt alloy which is being manufactured at Deloro, were among the products shown.

The exhibit was in charge of Mr. W. R. Rogers of the Bureau of Mines staff. His enterprise in adding new features to the exhibit was well rewarded by the interest shown by visitors.

### BULLION VALUE OF SILVER.

Anglo & London-Paris National Bank of San Francisco monthly circular says of silver: Apparently all the mints of the world are at work coining standard or subsidiary silver coin and demand for the metal is growing and the price has been steadily rising. Already bullion value of the pure silver in some coins in some countries is equal to or greater than face value of the coins, and a very slight increase of bullion value over face value will lead to exporting or melting.

This had led some to suppose that silver was remonetizing itself and that without legislation the old ratios of 15 or 16 to one of gold would re-establish themselves throughout the world. Silver has a long road to travel yet before that point is reached, as will be seen by the table following, which shows price per ounce at which bullion value of silver in the coin is equal to face value in country of issue, as fixed by director of the mint in United States currency.

The table shows the situation only roughly, as bullion value of silver usually differs in different countries, and at present may differ materially:

	Face value in Canadian currency cents	Pure silver contents grains	Price at which silver in coin equals face value, cents
Canadian dollar .....	100	333.00	144.144
U. S. dollar .....	100	371.25	129.293
U. S. half dollar .....	50	173.61	138.241
Philippine peso .....	50	246.912	97.201
Philippine half peso .....	25	115.74	103.681
Mexican peso .....	49.84	377.1395	63.433
Mexican half peso .....	24.92	154.32	77.512
British shilling .....	24.33	80.7272	144.665
French franc* .....	19.29	44.286	143.713
German mark .....	23.81	77.16	148.118
Japanese half yen .....	24.92	124.9992	95.693
Indian rupee .....	32.44	165.00	94.371

\*Standard coins of other countries in Latin Union have same ratio.

### NIPISSING'S BIG PRODUCTION.

Manager Hugh Park, of the Nipissing Mine, in his regular monthly report to the president and directors, states that during the month of August the company mined ore of an estimated value of \$293,116, and shipped products from the Nipissing and Customs ore of an estimated net value of \$588,254.

No new veins were encountered during the month, but the regular sources of production continued to be satisfactory. All stopes are keeping up their tonnage and value, and several have considerably exceeded the limit expected. A number of new working places were started, some on exploration and others developing promising veins encountered during previous months.

An estimate of production for the month of August is: Washing plant, \$141,420; low grade mill, \$151,696; totals, \$293,116. The low grade mill treated 6,395 tons, the high grade mill treated 32 tons and shipped 640,092 ounces fine silver.

During the current year Nipissing shipped ore of an estimated value of \$2,057,283. The production has shown a steady increase since the month of March. The monthly production of the company dating back to the beginning of the present year follows: August \$293,116, July \$272,496, June \$269,469, May \$261,663, April \$259,082, March \$256,953, February \$271,527, January \$172,983, total for year to date \$2,057,283.



Nipissing Mines Co. Ltd. has been incorporated in Ontario, Canada, with \$6,000,000 capital, to own and control the Nipissing Mining Co., an operating concern, and to exercise the functions of the Nipissing Mines Co. of Maine.

Within a fortnight it is expected that the Maine corporation will have been dissolved after all its assets and business have been transferred to the newly organized company. The new Ontario concern will issue new certificates share for share for those of the existing company.

Nipissing has shared handsomely in the advance of silver through sales made at top prices. Many of these transactions have taken place on a basis of Vancouver prices, or several cents an ounce over the New York quotation. A small part of the premium would have to cover extra cost of transportation across the continent although much of it would accrue to profits.

Dollar silver means that Nipissing has in reserve \$9,000,000 in gross values against \$4,500,000 when the metal was at 50 cents an ounce. At a cost of 30 cents an ounce the maintenance of dollar silver would add \$6,300,000 to net profits from the 9,000,000 ounces now known to be below ground.

### TEMISKAMING.

Cobalt, Sept. 11.—Considerable comment is rife throughout the camp over the new outbreak of hostilities between President F. L. Culver, of the Temiskaming Mining Company, and Mr. Max Morganstern, of New York.

At the special general meeting of shareholders held in Toronto on Thursday last Mr. Douglas Mutch, E.M., of the T. H. and B., was by resolution appointed by the shareholders to examine the Temiskaming mine, he being the unanimous choice of the large majority vote represented by Mr. Morganstern.

On Saturday morning Mr. Mutch, in company with Mr. Morganstern, arrived at the Temiskaming, armed with the resolution, and announcing that he was there to begin his examination of the mine as ordered by the majority of the shareholders. Much to the surprise of both gentlemen President Culver refused the request to permit either to even go underground. He is said to have acknowledged that the resolution presented by Engineer Mutch was correct in every particular and regularly passed at the meeting he had presided over on Thursday.

Mr. Culver's refusal to carry out the wishes of his shareholders according to report, was based on the fact that Mr. Mutch had not yet been officially notified of his appointment, and until such had been carried out he would continue to refuse as well as until arrangements regarding costs and conditions for such examination and the handling of the report. Mr. Mutch after carefully reading the resolution passed at the shareholders' meeting, refused also to treat with President Culver because of the fact neither his name was mentioned therein nor was there any provision for the making of any arrangements as demanded by Culver, against the shareholders' representative. The opposing forces locked horns in a wordy argument, but Mr. Culver held the fort. It is likely an appeal will be made to the courts, as the feeling throughout the camp is that Mr. Culver was somewhat indiscreet in his stand.—Mail and Empire.

### WILL RESUME CONSTRUCTION OF STEEL PLANT.

The United States Steel Corporation has completed its plans for the erection of a \$20,000,000 plant at Ojibway, Ontario, and development work in that connection will now be carried on, according to Ward B. Perley, vice-president and general manager of the Canadian Steel Corporation, the Canadian subsidiary of the big U. S. concern. This company was incorporated some three years ago. A tract of land on the St. Clair River, north of Windsor was purchased, a separate municipality was established, and streets were laid out for an ideal town, such as the United States Steel Corporation has at its American plants. Then the war put a temporary stop to construction. The bid for tenders for the construction of a slip and huge concrete and steel docks for the Ojibway Company was the sign for a renewal of construction and further plans of the company will now be proceeded with.

The plant will include blast furnaces and mills for the manufacture of wire, rails and bars, and perhaps other steel products.—Financial Times.

### THE EMBARGO ON IRON.

Philadelphia, Sept. 11.—Shipments of iron to Canada came to an abrupt end Aug. 15. Embargo placed by government went into effect over night. The only notification was sent to railroads, which refused to accept shipments Aug. 16. Shippers have since found it impossible to satisfy government requirements as to export licenses for iron. Forms for export licenses have been changed three times, and now prescribed form calls for answer of every conceivable question that might have anything to do with the matter. Application must be signed by shipper, consumer, Washington authorities and Canadian authorities, and document must travel several hundred miles before finally being attached to bill of lading. Even then if shipment is not made all at once, additional applications must be sent around the circle.

Difficulty of business under these conditions is enormous. Meanwhile, Canadian plants dependent on supply of iron from United States have been forced to go into market to supply their needs or shut down. How long present condition will last is uncertain, but there are indications that iron will begin to go to Canada again in limited quantities soon.

### ALBERTA'S COAL PRODUCTION.

Some very interesting figures are given in the quarterly report of the Dominion mines branch for the quarter ending June 30 last. The report shows the monthly production of the various mining districts in Alberta and the total sales of the different kinds of coal mined.

The report also shows the number of tons of coal imported through the various ports of the Dominion during the first and second quarters, and the value. The total number of tons of coal imported during the first six months of the present year was 1,097,546 tons as compared with 1,161,164 tons during the first six months of 1916.

The total number of tons of lignite, bituminous and anthracite coal mined in Alberta during the months of April, May and June was 416,845 tons, and the total number of men employed in the various mines is given at 11,856.

The total output of anthracite coal from the Banff district for the second quarter is given at 3,111 tons, which was practically all sold within the province.



# :-: Markets :-:

## STANDARD STOCK EXCHANGE.

(Continued—J. P. Bickell &amp; Co.)

As of Close, Sept. 11.

### Gold.

	Asked.	Bid.
Apex. . . . .	.09½	.09¾
Dome Extension . . . . .	.16½	.17½
Dome Lake . . . . .	.15	.16
Dome Mines . . . . .	10.00	....
Imperial. . . . .	.02¾	.03
McIntyre. . . . .	1.60	1.61
Hollinger. . . . .	5.00	5.15
Newray. . . . .	.81	.82
Porcupine Crown . . . . .	.40	.44
Porcupine Vipond . . . . .	.28	.30
Preston East Dome . . . . .	.04½	.04¾
Teck Hughes . . . . .	.40	....
West Dome . . . . .	.18½	.18¾

### Silver.

	Asked.	Bid.
Adanac. . . . .	.19½	.19¾
Bailey. . . . .	.06	.06¼
Beaver. . . . .	.38¼	.39
Buffalo. . . . .	1.25	....
Chambers Ferland . . . . .	.15½	.16
Coniagas. . . . .	....	4.00
Crown Reserve . . . . .	.28	.28½
Gifford. . . . .	.05¼	.05½
Great Northern . . . . .	.06¾	.07
Hargraves. . . . .	.16	.16¼
Hudson Bay . . . . .	....	.38
Kerr Lake . . . . .	5.70	5.80
La Rose . . . . .	.50½	.55
McKinley. . . . .	.71	.72
Nipissing. . . . .	9.25	9.35
Peterson Lake . . . . .	.11¾	.12
Right of Way . . . . .	.05	.05¼
Seneca Superior . . . . .	.02	.03½
Silver Leaf . . . . .	.01¾	.02
Temiskaming. . . . .	.33	.34
Trethewey. . . . .	.15	.16
Wettlaufer. . . . .	.07	.08

### SILVER PRICES.

	New York. cents.	London. pence.
Aug. 27 . . . . .	88¾	45
" 28 . . . . .	88¾	45
" 29 . . . . .	89¾	45½
" 30 . . . . .	90¾	46
" 31 . . . . .	90¾	46
Sep. 1 . . . . .	90¾	46
" 3 . . . . .	holiday	47
" 4 . . . . .	93¾	47½
" 5 . . . . .	95¾	48½

### TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.

Cobalt oxide, grey, \$1.65 per lb.

Cobalt metal, \$2.25 per lb.

Nickel metal, 45 to 50 cents per lb.

White arsenic, 15 cents per lb.

Sept. 10, 1917—(Quotations from Canada Metal Co., Toronto)

Spelter, 11 cents per lb.

Lead, 12¾ cents per lb.

Tin, 63 cents per lb.

Antimony, 18 cents per lb.

Copper, casting, 32 cents per lb.

Electrolytic, 33 cents per lb.

Ingot brass, yellow, 20 cents; red, 25½ cents per lb.

Sept. 10, 1917—(Quotations from Elias Rogers Co., Toronto)

Coal, anthracite, \$9.50 per ton.

Coal, bituminous, nominal, \$9.00 per ton.

### Porcupine Gold Production.

Year.	Ounces.	Value.
1910. . . . .	\$1,947	\$35,539
1911. . . . .	765	15,437
1912. . . . .	83,725	1,730,628
1913. . . . .	207,748	4,294,113
1914. . . . .	251,131	5,190,794
1915. . . . .	362,186	7,480,901
1916. . . . .	452,095	9,397,536
First half year, 1917 . . . . .	228,673	\$4,586,941

### Dividends paid by Ontario Gold and Silver Mining Companies

	Cobalt.	Porcupine.	Kirkland Lake.
Paid during 1916 . . . . .	\$4,958,650	\$4,166,000	\$260,750
Total paid to end of 1916. . . . .	67,459,852	9,168,000	325,937

### Dividends Paid by Cobalt Silver Mines to Dec. 31, 1916.

Mining Company.	Amount of Di- vidends and Bonuses Paid During 1916.	Total amount of Dividends Paid to 31st Dec., 1916.
Beaver. . . . .	\$60,000	\$650,000
Buffalo. . . . .	....	2,787,000
Caribou-Cobalt (Drummond) . . . . .	....	225,000
Casey-Cobalt. . . . .	....	203,249
City of Cobalt . . . . .	....	139,231
Cobalt Central . . . . .	....	192,845
Cobalt Lake . . . . .	....	465,000
Cobalt Silver Queen . . . . .	....	315,000
Cobalt Townsite . . . . .	....	966,726
Coniagas. . . . .	600,000	8,440,000
Crown Reserve . . . . .	....	6,102,399
Foster. . . . .	....	45,774
Hudson Bay (T. & H. B.) . . . . .	....	1,940,250
Kerr Lake (Holding Co.) . . . . .	600,000	6,720,000
La Rose (Holding Co.) . . . . .	299,725	6,882,707
Mining Corporation . . . . .	570,615	1,348,740
McKinley-Darragh-Savage . . . . .	269,723	4,876,474
Nipissing Mines Co. (Hold. Co.) . . . . .	1,500,000	15,340,000
Peterson Lake . . . . .	168,127	420,318
Right of Way Mines . . . . .	16,855	235,965
Right of Way Mining Co. . . . .	....	324,643
Seneca Superior . . . . .	598,605	1,579,817
Temiskaming. . . . .	225,000	1,684,156
Trethewey. . . . .	50,000	1,111,998
Wettlaufer. . . . .	....	637,465
Private Corporations (Est.) . . . . .	....	3,825,000
Totals. . . . .	4,958,650	67,459,852

### Dividends Paid by Porcupine Gold Mines.

To December 31st, 1916.

Mine.	Amount of Di- vidends and Bonuses Paid During 1916.	Total amount of Dividends Paid to 31st Dec., 1916.
Dome Mines . . . . .	\$800,000	\$1,200,000
Hollinger Gold Mines . . . . .	3,126,000	7,456,000



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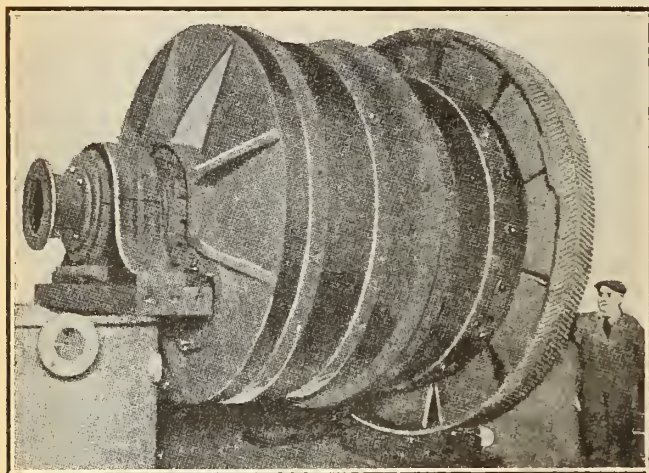




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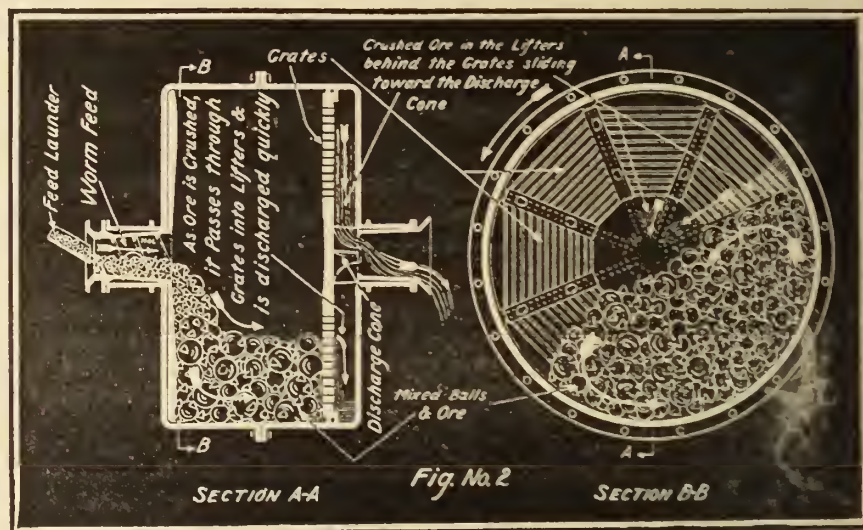
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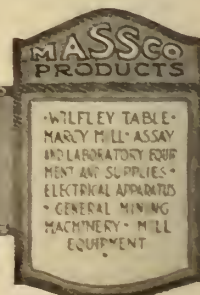
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The Court further confirms this important dictum by saying: "*If the only agitation to which the pulp was subjected (after such agitation as in the prior art was necessary to mix the oil and ore) was the agitation of the Callow Cells, we would not say that that agitation amounted to or was the equivalent of the violent agitation of the patent disclosure and constituted infringement.*"

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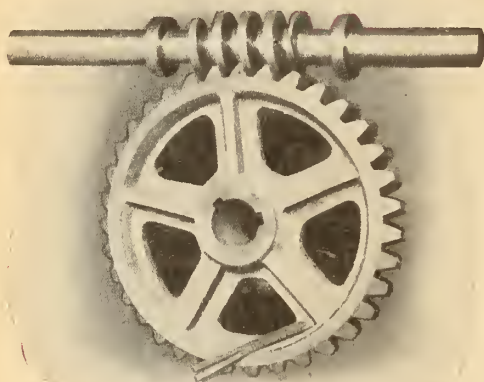
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- The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.
- Building and Ornamental Stones of Canada (Western Provinces). Vol IV., by W. A. Parks, Ph.D.
- Feldspar in Canada. Report on, by H. S. de Schmid, M.E.
- Peat, Lignite and Coal: their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.
- Annual Report of Mineral Production during Calendar Year, 1915, by John McLeish, B.A.
- The Petroleum and Natural Gas Resources of Canada: Vols. I. and II., by F. G. Clapp, M.A., and others.
- The Value of Peat Fuel for the Generation of Steam. Bulletin No. 17, by John Blizard, B.Sc.
- Cobalt Alloys with Non-corrosive Properties. Report on, by H. T. Kalmus, B.Sc., Ph.D.
- Electro-thermic Smelting of Iron Ores in Sweden. Report on, by A. Stansfield, D.Sc.
- Non-metallic Minerals Used in Canadian Manufacturing Industries. Report on, by H. Frechette, M.Sc.

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Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

### GEOLOGICAL SURVEY

#### Recent Publications

- Memoir 85. Road Material Surveys in 1914, by L. Reinecke.
- Memoir 87. Geology of a Portion of the Flathead Coal Area, British Columbia, by J. D. Mackenzie.
- Memoir 92. Part of the District of Lake St. John, Quebec, by John A. Dresser.
- Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.
- Memoir 94. Ymir Mining Camp, British Columbia, by Charles Wales Drysdale.
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- Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.
- Map 57A. Frank, Alberta (showing the landslide of 1903).
- Map 63A. Moncton Sheet. Westmorland and Albert Counties, New Brunswick. Topography.
- Map 151A. Nansen and Victoria Creeks, Nisling River, Yukon Territory.
- Map 152A. Kluane Lake, Yukon Territory.
- Map 154A. Southwestern Yukon.
- Map 157A. East Sooke. Vancouver Island, British Columbia. Topography.
- Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.
- Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.
- Map 166A. Portion of Flathead Coal Area. Kootenay District, B.C. Topography.
- Map 182A. Portion of Flathead Coal Area. Geology.
- Map 186A. Explored Routes between Lake Athabaska and Great Slave Lake on the Tazin, Taltson, Slave and Peace Rivers.
- Map 1667. Slocan Mining Area. Kootenay District, B.C.
- Map 1677. Coleraine Sheet, Megantic and Wolfe Counties, Quebec.

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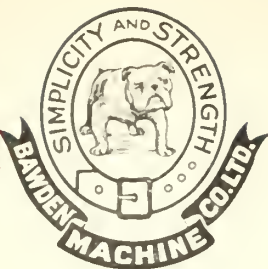


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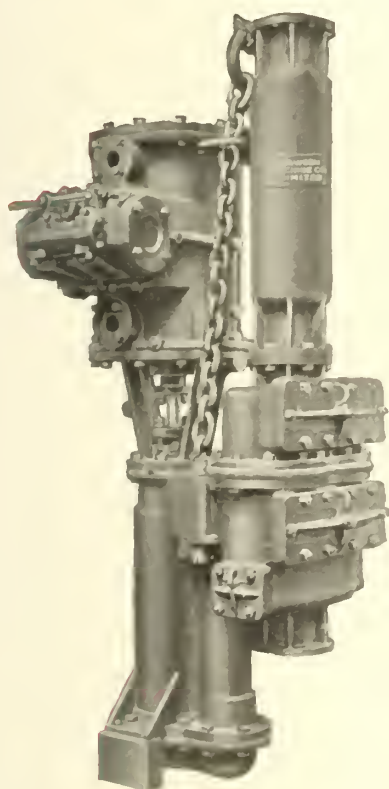
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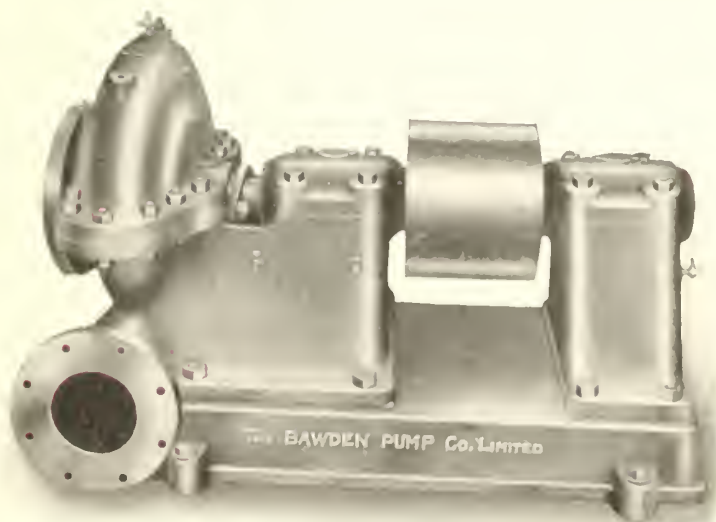
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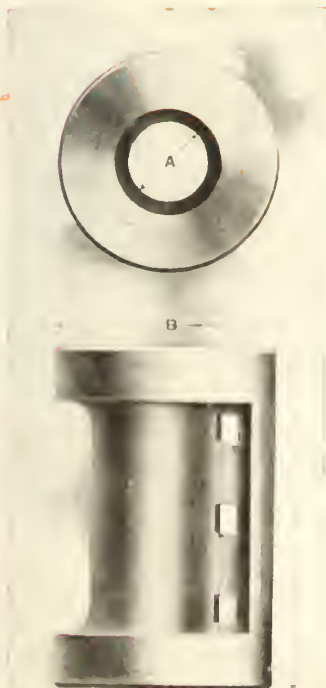
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VOL. XXXVIII

TORONTO

No. 19

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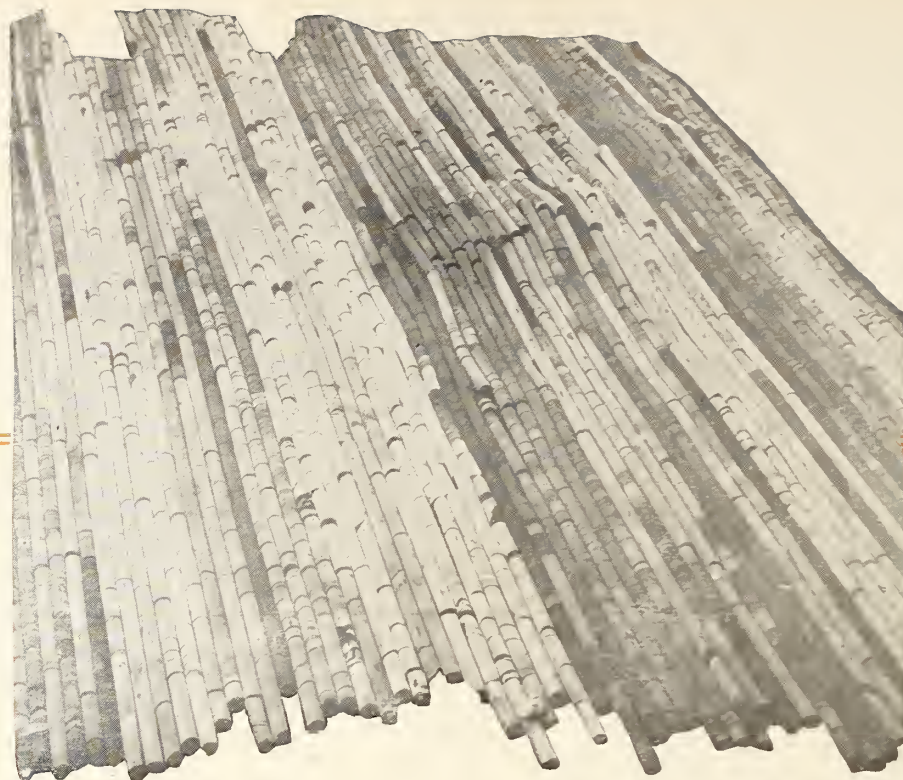
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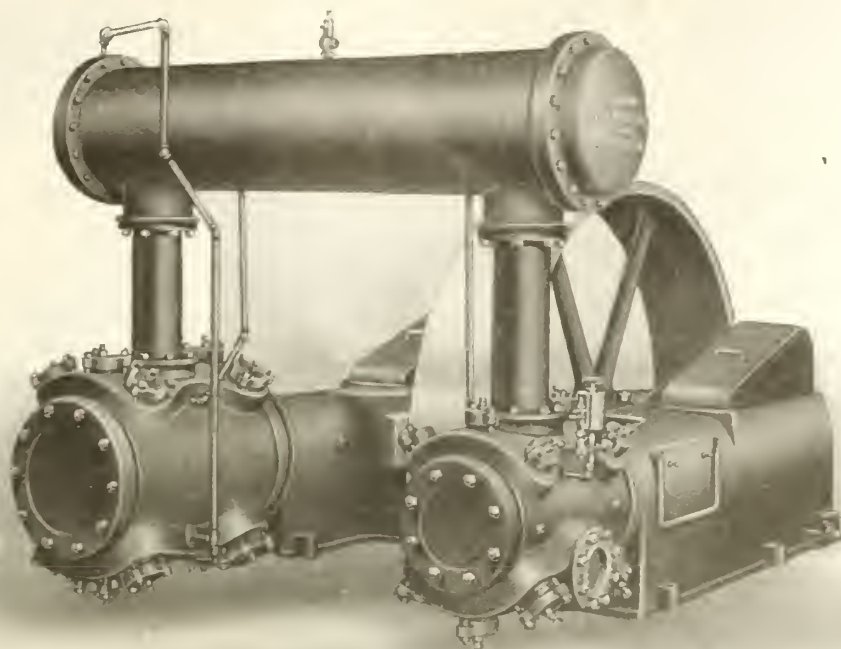
has been noted among mineral land owners, mine operators, and mining engineers for its completeness and absolute dependability. The accuracy of its records have caused them to be accepted in hundreds of instances as final proof of the mineral value of lands or the location and nature of orebodies tested by this means.

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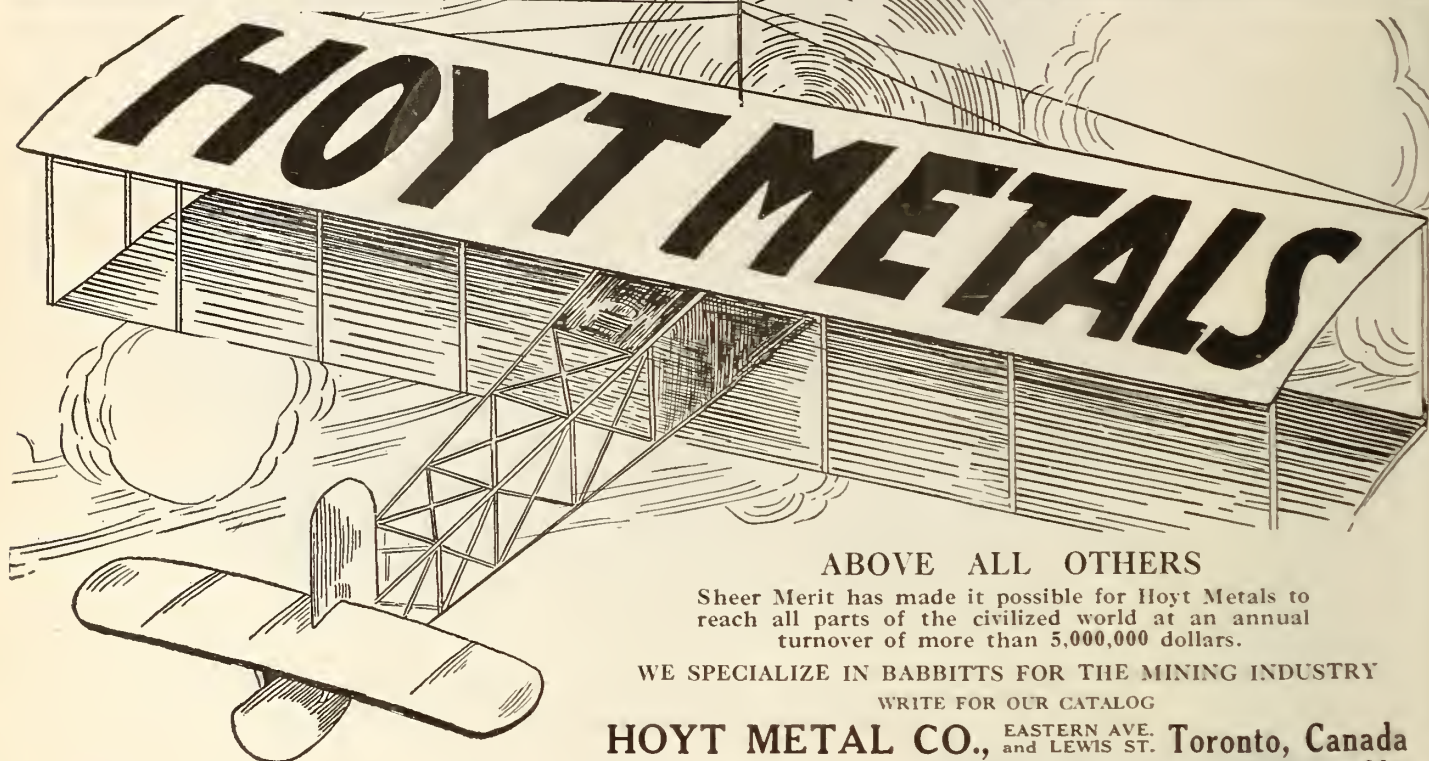
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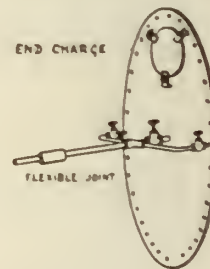
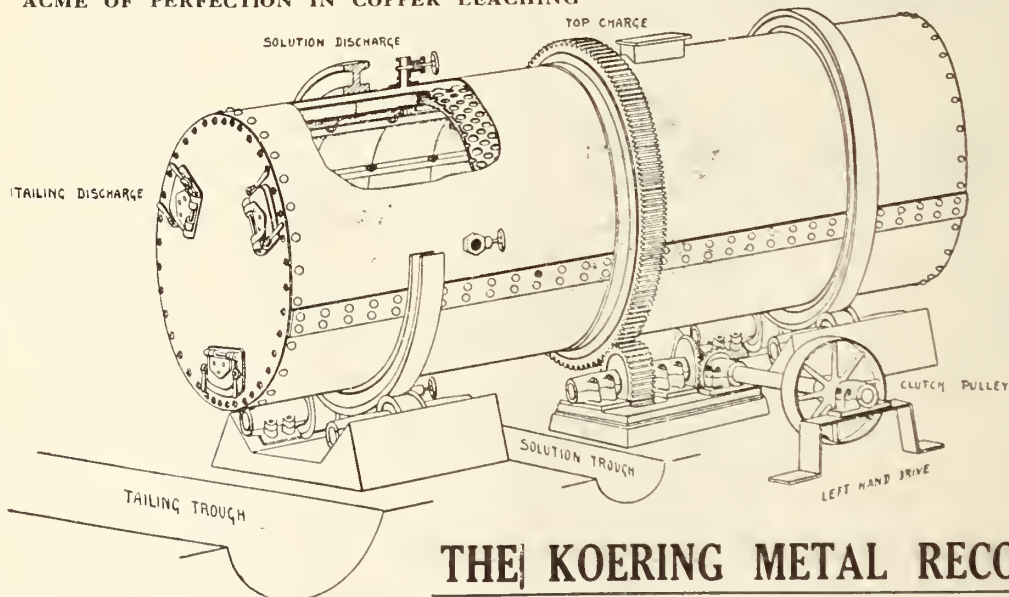
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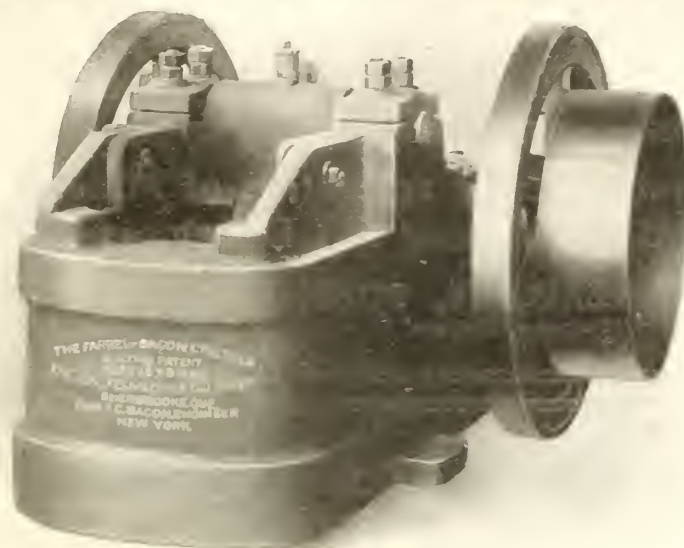
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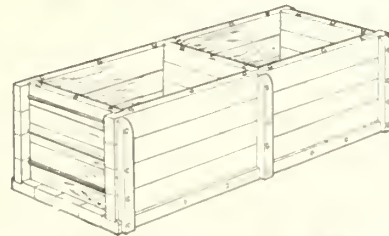
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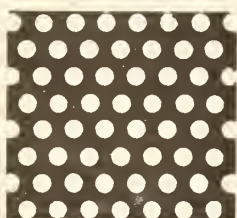
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# The Minerals of Nova Scotia

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COAL, IRON, COPPER, GOLD, LEAD, SILVER, MANGANESE, GYPSUM, BARYTES, TUNGSTEN, ANTIMONY, GRAPHITE, ARSENIC, MINERAL PIGMENTS, DIATOMACEOUS EARTH.

Nova Scotia possesses extensive areas of mineral lands and offers a great field for those desirous of investment.

**Coal** Over six million tons of coal were produced in the province during 1916, making Nova Scotia by far the leader among the coal producing provinces of the Dominion.

**Iron** The province contains numerous districts in which occur various varieties of iron ore, practically at tide water and in touch with vast bodies of fluxes. Deposits of particularly high grade manganese ore occur at a number of different locations.

**Gold** Marked development has taken place in this industry the past several years. The gold fields of the province cover an area approximately 3,500 square miles. The gold is free milling and is from 870 to 970 fine.

**Gypsum** Enormous beds of gypsum of a very pure quality and frequently 100 feet thickness, are situated at the water's edge.

High grade cement making materials have been discovered in favorable situations for shipping.

Government core-drills can be had from the department for boring operations.

The available streams of Nova Scotia can supply at least 500,000 h.p. for industrial purposes.

Prospecting and Mining Rights are granted direct from the Crown on very favorable terms.

Copies of the Mining Law, Mines Reports, Maps and Other Literature may be had free on application to

**HON. E. H. ARMSTRONG,** - **Halifax, N. S.**

*Commissioner of Public Works and Mines*



## PROVINCE OF QUEBEC MINES BRANCH

### Department of Colonization, Mines and Fisheries

*The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, etc.*

The Mining Law gives absolute security of Title and is very favourable to the Prospector.

**MINERS' CERTIFICATES.** First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

**WORKING CONDITIONS.** During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

**SIX MONTHS AFTER STAKING.** At the expiration of six months from date of the staking, the prospector, to retain his rights, must take out a mining license.

**MINING LICENSE.** The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

**MINING CONCESSION.** Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

**PROVINCIAL LABORATORY.** Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, MONTREAL, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

**HONOURABLE HONORÉ MERCIER,**  
MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC.

# The Flotation Process

All patent and other rights to this process  
in North America are now controlled by

## Minerals Separation North American Corporation

who is the registered owner of the following Canadian patents: Nos. 76,621; 87,700; 94,332; 94,516; 94,718; 96,182; 96,183; 99,743; 127,397; 129,819; 129,820; 134,271; 135,089; 137,404; 142,607; 147,431; 147,432; 148,275; 151,479; 151,480; 151,619; 151,810; 157,488; 157,603; 157,604; 160,692; 160,693; 160,694; 160,846; 160,847; 160,848; 160,849; 160,850; 160,937; 163,587; 163,608; 163,707; 163,936; 165,390; 166,415; 167,474; 167,475; 167,476; 167,603.

On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

### NOTICE

Notice is hereby given that we will enforce our patents and stop all infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

Notice is further given that no one is authorized to introduce our processes or apparatus into the United States, Canada or Mexico.

All applications should be made direct to

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### Aggregate Value of \$516,270,253

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1894, inclusive, \$88,904,199; for five years, 1894-1899, \$46,906,258; for five years, 1899-1904, \$90,391,394; for five years 1904-1909, \$121,618,733, for five years, 1909-1914, \$139,002,161, for the year 1915, \$29,447,508.

### Production During last ten years, \$267,607,077

Lode-mining has only been in progress for about twenty years, and not 20 per cent. of the Province has been even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than those of any other Province in the Dominion, or any Colony in the British Empire.

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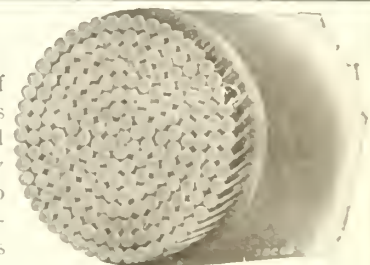
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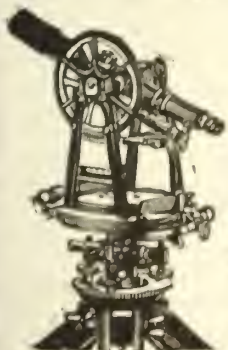
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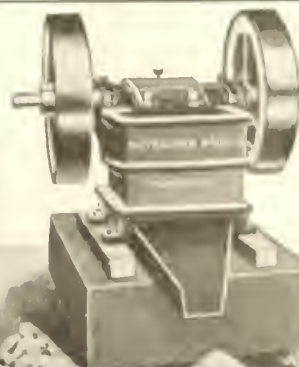
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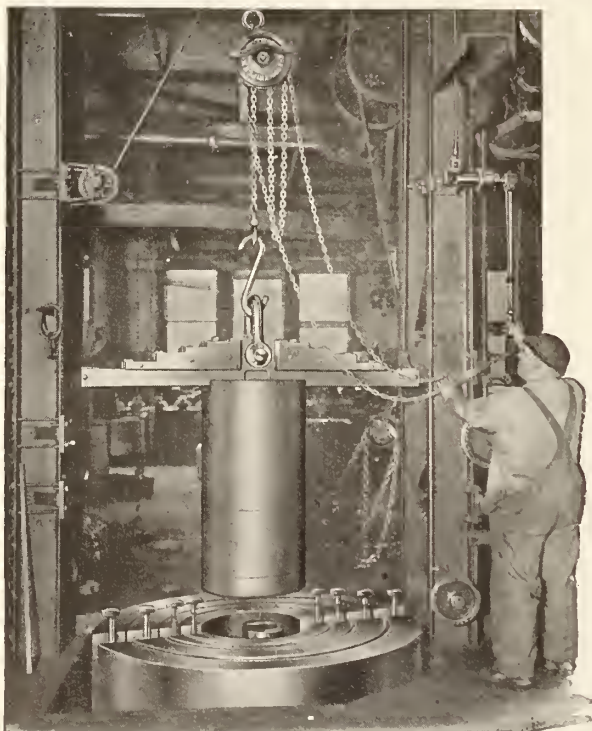
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# THE CANADIAN MINING JOURNAL

VOL. XXXVIII.

TORONTO, October 1st, 1917.

No. 19

## The Canadian Mining Journal

With which is incorporated the

"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada.

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### ADVERTISING COPY.

Advertising copy should reach the Toronto Office by the 8th for issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

### ADVERTISING.

The Canadian Mining Journal covers the Canadian mining field. Ask for advertising rates.

### CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post office at Buffalo N.Y., under the Act of Congress of March 3rd, 1879."

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### COLORED REPRODUCTIONS OF ORE.

In answer to many enquiries concerning the colored reproductions of ore which have appeared in the Canadian Mining Journal, we beg to advise our readers that this work is being done on our own presses. Some excellent colored plates will appear in coming numbers of the Journal.

The "Toronto World" claims that the Minerals Separation Company is controlled by Germans and that the flotation process originated in Germany. The company's methods are such that they have aroused much opposition and criticism is to be expected; but the "World" is not well informed as to the facts.

### THE MOLYBDENITE EMBARGO.

In this issue a correspondent who is developing a molybdenite property near Renfrew draws attention to the lack of uniformity in prices paid in the United States and in Canada for molybdenite, and to the result of this on development of low grade deposits.

The difference is very great. The Munitions Board is getting molybdenite at less than one-half the U. S. market price, and Canadian producers are not allowed to sell their product except to the Munitions Board.

Everyone is pleased to see the Imperial Government get its supplies at reasonable prices and \$1.00 per lb. is considered to be a high enough price to make the operation of a few Canadian molybdenite deposits profitable. It is unfortunate however that when United States buyers are asking for molybdenite and are offering big prices that we are not encouraged to develop some of the low grade and irregular deposits which might be operated profitably while the price is high. Development of such properties might result in the discovery of deposits which could be worked profitably when the price falls again.

Obviously the cost of producing molybdenite at most of the known properties will be high. Evidently however American users are experiencing difficulty in obtaining a sufficient quantity of molybdenite and they are willing to pay prices which would compensate for high cost of production. The Munitions Board price takes no account of the cost at individual properties; and though it is high enough to encourage producers who have good properties, there can be no doubt that the embargo is preventing development of the less promising deposits in Canada at a time when the higher price prevailing in the United States is encouraging the development of such deposits there.

If the munition makers are getting all the molybdenite they need it would be unwise to encourage the development of deposits less promising than those now being worked. On the other hand, if the supply in the United States is not sufficient and if the price ruling there can be taken as a fair indication of the demand, Canada is wasting an opportunity of marketing material that will be without value after the war.

A member of the British Columbia Legislative Assembly who, seemingly, thinks that ministers of the Provincial Government should wear top hats and Prince Albert coats on all occasions, informed a newspaper man that when the Minister of Mines for British Columbia visited a mine in his district he wore overalls. Since then Provincial newspapers have made frequent mention of the fact that such was the case and numerous references have been made in print to the "overall" trip of the Minister of Mines.



### THE INSTITUTE OF METALS.

The Annual Autumn Meeting of the Institute of Metals, London, was held on Wednesday, September 19th. At the opening session, between the hours of 4 p. m. and 6.30 p. m. the following communications were presented:

(1) "Experiments on the Fatigue of Brasses." By B. Parker Haigh, D.Sc. (London).

(2) "Hardness and Hardening." By Professor T. Turner, M.Sc. A.R.S.M. (Birmingham).

(3) "The Effects of Heat at Various Temperatures on the rate of softening of cold-rolled Aluminium Sheet." By Professor H. C. H. Carpenter, M.A., Ph.D., A.R.S.M. (London), and L. Taverner, A.R.S.M. (London).

(4) Note on "A Comparison Screen for Brass." By O. W. Ellis, M.Sc., (London).

At the evening session, from 8 p. m. to 10 p. m., the Programme will be as follows:

(5) "Further Notes on a High Temperature Thermostat." By J. L. Haughton, M.Sc. (Teddington), and D. Hanson, M.Sc. (Teddington).

(6) "Principles and Methods of a new System of Gas Firing." By A. C. Ionides (London).

(7) "Fuel Economy Possibilities in Brass Melting Furnaces." By L. C. Harvey (London).

(8) "The Effect of Great Hydrostatic Pressure on the Physical Properties of Metals." By Professor Zay Jeffries, B.Sc. (Cleveland, U. S. A.).

(9) Note on "The Use of Chromic Acid and Hydrogen Peroxide as an Etching Agent." By S. W. Miller (Rochester, N. Y., U. S. A.).

In connection with Mr. Ionides' Paper a demonstration of a new system of furnace heating was given.

### OPHIR.

Toronto, Sept. 25.—The proposal to increase the capital of the Ophir Company to \$1,500,000 was unanimously ratified at the special meeting of shareholders yesterday afternoon. Application for the necessary supplementary letters patent will accordingly be immediately made.

The Granby Consolidated Company intends printing monthly the Granby News, a small publication chiefly for circulation among its numerous mine and smeltery employees, and which will contain information concerning the company's operations likely to be of interest to those for whom it will primarily be printed.

The Greenwood Ledge states that copper matte is being sent from the Ladysmith smeltery to the Canada Copper Corporation's works at Greenwood in Boundary district of British Columbia, to be converted into blister copper.

According to the Vancouver World, the Geological Survey of Canada has decided to open an office in the city of Vancouver, British Columbia, "in view of the great importance to the Dominion at large of the mining industry" of that province.

Mr. Raleigh P. Trimble, for years considerably interested in the development of several new mining properties situated in the western part of Omineca division of British Columbia, has returned to that district from Portland, Oregon.

### CORRESPONDENCE.

#### THE MOLYBDENITE EMBARGO.

To the Editor of the Canadian Mining Journal:

Sir,—I am very much interested in the production of molybdenum and at the present time am busily engaged in the development of a molybdenite property near Renfrew.

The difficulties of initial mining, as will be known to all interested, are both expensive and great, deserving all the encouragement possible. For this reason I have recently been in communication with the Imperial Munitions Board on the question of the price which they are permitted to pay for concentrates for the Imperial Government. This price is in the neighborhood of \$1.00 per lb.

In the most likely possibility of low grade ore being encountered, say under 1%, the cost of mining is so heavy that it does not leave much, if any, margin for the owner, and then only in the event of him being fortunate enough to strike a large body soon after beginning work.

In addition to the heavy cost of mining I have also pointed out to the Board the tremendous difference between their price, plus an embargo, and the prices which can be obtained in the United States, which, my latest report says, is \$2.40 per lb. Owing to the embargo, producers are not permitted to take advantage of outside opportunities.

Molybdenum is a most urgent necessity to the Imperial Government and our Allies at this critical time, and I do not take second place to anybody in my loyalty, but I do strongly believe that the Imperial Government, through the Imperial Munitions Board, should allow a fair price to encourage the production, more extensively of this metal, or at least allow us to take advantage, to some extent, of the higher values offered in the United States.

If there are other molybdenite producers interested in this question perhaps a little discussion might result in an improvement in conditions.

I wish to make my mine successful and in some small way do "My Bit" towards the ultimate result of the Allied Cause; but unfortunately I am not in a position to carry on business on philanthropic lines, much as I would wish.

Sept. 20, 1917., 123 Bay St., Toronto.

Yours, etc.

A. W. Taylor.

The Taylor Molybdenite Mines, Renfrew.

#### COPPER 23½ CENTS PER LB.

Washington, Sept. 20.—Copper prices were fixed today at 23½¢ a pound, about three cents below the prevailing market, by agreement between the Government and leading copper producers, effective for four months.

Sales to the Government, the public and the allies will be at this price, f. o. b. New York, and producers agreed not to reduce wages now paid in the industry. They also pledged themselves to maintain maximum production and to prevent copper from falling into the hands of speculators.

#### MAJOR NEIL MACDONALD HOME.

Among the soldiers who returned to Canada last week was Major Neil "Foghorn" MacDonald, of Winnipeg. "Foghorn" enlisted as a private.



# Mineral Wealth Along the T. & N. O. Railway

By A. A. Cole.

In 1902 the Ontario Government decided to build a colonization railroad northward from the Canadian Pacific Railway at North Bay, for the purpose of opening up what is known as "The Clay Belt" of Northern Ontario. With the meagre information then available, it required considerable courage and optimism to foresee this colonization railroad as a paying investment, even in the distant future.

To reach the southern border of the Clay Belt required the construction of over a hundred miles of railway, through a country whose only apparent promise of future freight revenue was from the lumbering industry. Before the line was completed, however, a discovery was made which changed the whole aspect of the Government's investment. Almost within sight of the rich farm lands of Temiskaming, the first silver finds were made at Cobalt in the Autumn of 1903 by members of the railway construction parties. From this time forward the mining industry became the most important revenue producer for the Government Railway; and it is likely to hold this lead for many years to come.

The Cobalt silver deposits proved to be very rich, but most investors were skeptical. Several small shipments of silver ore were made in 1904, but it was not till the following year that real mining operations were commenced. Interest in the new camp rapidly increased, till in 1905 it reached the proportion of a boom. The District was easily accessible and it was a novelty for investors to be able to reach a thriving mining camp in a Pullman car in little more than twenty-four hours of leaving New York City. The stocks of the producing companies became inflated beyond their real value and carried with them the usual wild-cat schemes. The inevitable crash and slump followed, and for some years afterwards speculation in mining stocks in this district was practically dead.

In the meantime the legitimate industry was making steady and rapid progress, as may be seen from the accompanying table of production.

**Table No. 1. Silver Production of the Cobalt Camp**

Year	Ounces	Value
1904	206,875	111,887
1905	2,451,356	1,360,503
1906	5,401,766	3,667,551
1907	10,923,311	6,155,391
1908	19,437,875	9,133,378
1909	25,897,825	12,461,576
1910	30,645,181	15,478,947
1911	31,507,791	15,953,847
1912	30,243,859	17,408,935
1913	29,681,975	16,553,981
1914	25,162,841	12,765,461
1915	23,730,839	11,742,463
1916	20,000,000	13,000,000
	254,391,494	\$135,693,020

The above figures may be expressed in another form in the statement that the Cobalt District is now producing silver at the rate of  $2\frac{1}{4}$  tons per working day, or going back fourteen years, it has produced over two tons of pure silver for every working day since the camp was discovered in 1903.

The silver ores of Cobalt are complex and there was no place in Eastern Canada to treat them, so that all the early shipments went to smelters in the Eastern United States, only the richer ores being shipped. The ores contained other valuable constituents besides silver, and soon a number of Canadian enterprises were started, of which the two largest are now operating on an extensive scale, producing not only refined silver, but refined arsenic, cobalt and nickel either as metals or in other saleable forms. The principal source of cobalt oxide used to be New Caledonia, but since these Canadian refineries have entered the market, they have driven out all competitors.

The silver bearing veins are narrow, but as they were taken out and mining developments became more extensive, it was found that there still remained a large tonnage of low grade silver-bearing material that could not pay the high freight and smelter charges without previous treatment. The first concentrating mill started operations in 1907 and others quickly followed, till at the present time there are fifteen operating mills. The tonnage of ore treated increased from 50,000 in 1907 to 635,000 tons in 1916. The average reduction in weight due to concentration is from 45 to 1, and as the percentage of values recovered is about 80, the increased value per ton of the concentrate is about 36 times that of the original ore. An important metallurgical advance has been made by the introduction of Oil-Flotation. It is not likely that this method of concentration will supersede the standard method already in use in the camp, but in many cases it can be made a valuable addition to the existing plants and the extraction bettered with only a small additional cost.

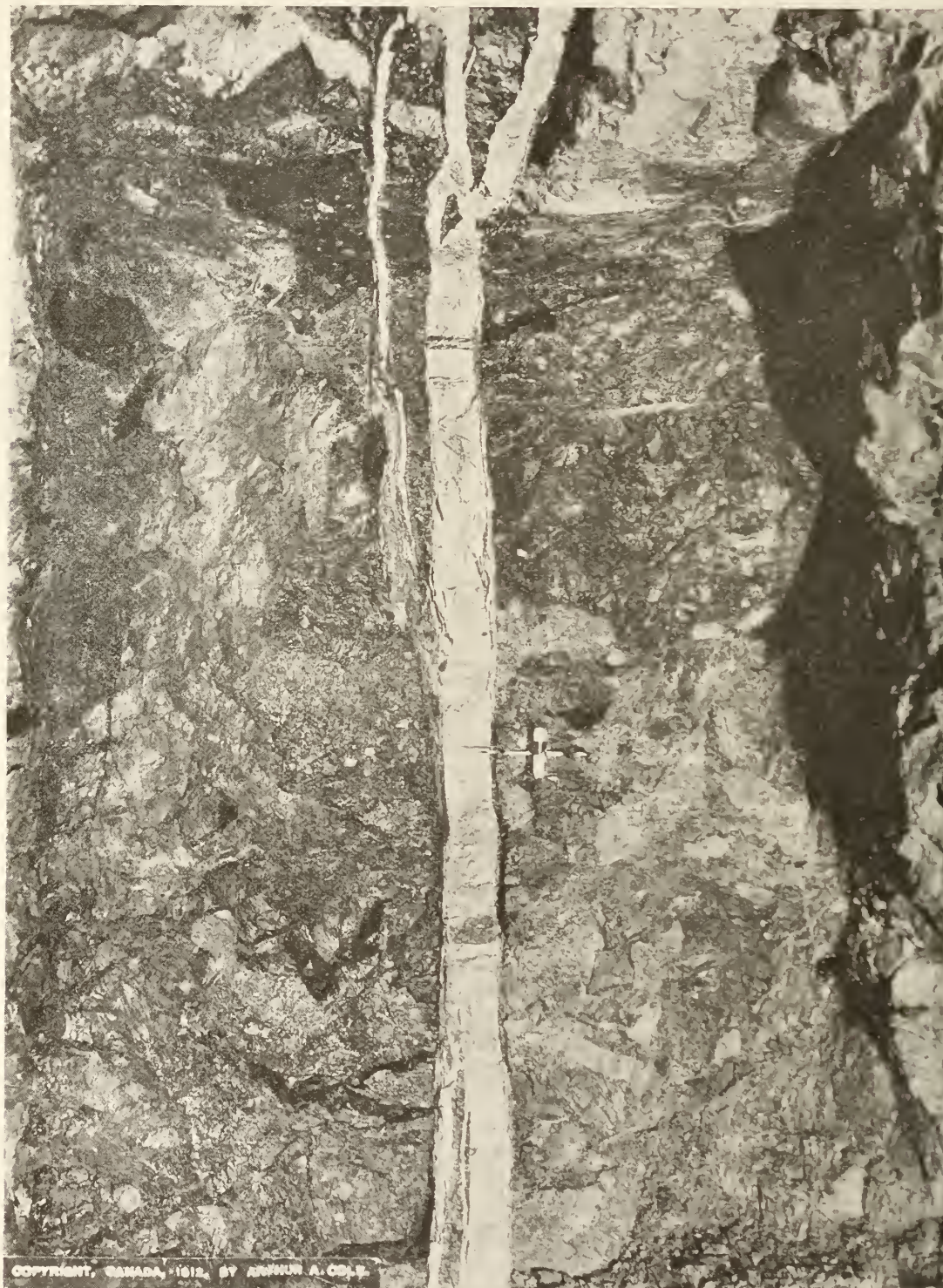
The principle of oil flotation may be briefly stated as follows. If to a finely ground pulp in water certain oils are added in small quantities and then aerated it is found that the oils have an affinity for the metallic particles which they do not have for the gangue. The foam made by the oil carries off the metallic particles thus making a concentrate which while not by any means perfect is still quite valuable to the Cobalt Camp, as silver is one of the metals that will thus float. The oils mostly used in Cobalt are Pine Oil, Creosote and Coal Tar. Recently it has been found the expensive pine oil which has to be imported can be replaced by hardwood creosote oil of Canadian production. The adoption of oil flotation will not only make available for treatment large tonnages of tailings now being produced by the mills, but many tailings dumps will also be retreated at a profit. The tonnage of such old tailings dumps will amount to about  $21\frac{1}{2}$  million tons. If we assume that at least 4 ounces per ton can be saved at a gross cost of 2 ounces we have a profit on this material alone of nearly four million dollars at the present price of silver. Oil flotation will also make lower grade material treatable at a profit, increasing the available tonnage and thus lengthening the life of the Camp.

Cyanidation has been introduced to a greater or less degree in several of the mills so that considerable bullion is now produced instead of a concentrate which had to be shipped out of the district for further refining.



The mills mentioned were all for the treatment of low grade ores and in the meantime all the high-grade ores including concentrates were shipped to the smelters. Two companies, the Nipissing and the Buffalo Mining Companies, determined to treat their high-grade ore at the mines, in order that they might have only bullion to ship. With this end in view each erect-

Cobalt Mills, Amalgamation and Cyanide.....	39%
Southern Ontario Smelters.....	45%
United States Smelters.....	16%
	-----
	100%



A Cobalt Silver Vein.

ed a high-grade mill. The method employed was a combination amalgamation and cyanide treatment, about 97% of the extraction being made by amalgamation. The tendency has thus been more and more towards the complete refining of the silver at the mine,

so that now four of the leading companies ship out their whole product in the form of refined silver bullion, while some of the remaining companies ship much of their product as bullion. With these two high-grade mills in Cobalt, and with the Coniagas and Deloro



smelters operating in Southern Ontario, most of the Cobalt ores are now treated in Canada as is shown by a statement covering the calendar year 1915.

With mining costs normal, but the grade of much of the ore unusually high, the profits were necessarily great. It has even paid some companies to pump out a whole lake, in order to recover the silver from the rich veins in the lake bottom. Twenty-four companies have paid dividends aggregating \$67,460,000 or 47% of the gross production.

As soon as the value of the Cobalt Camp began to be understood it was only natural that prospectors should spread out in all directions from it seeking similar deposits. Their work bore good results for other silver districts, Gowganda, Casey Township and South Lorrain were found, though none has yet been discovered comparable to Cobalt. As the prospectors pushed north towards the height-of-land, tales of gold discoveries began to come in. The early gold finds all proved disappointing and the old saying that "gold in paying quantities would never be found in Ontario" was often heard repeated. The history of early gold mining in Western Ontario, as in the Lake-of-the-Woods district, tended to strengthen the idea.

In the Autumn of 1909 promising gold claims were staked in the Porcupine Lake District, 100 miles north

development slow. With the large number of men in the bush, clearing and prospecting, forest fires became a constant menace in the dry summer months. The summer of 1911 was particularly noteworthy in this respect. The season was very dry and hot, and fire after fire, threatened the mines, burning over the Hollinger property in May and culminating in the disastrous conflagration of July 11th, in which more than seventy lives were lost and almost all the mining and milling plants completely destroyed. It was fortunate that a branch line of the Government Railway had been completed into the district and opened for traffic just a few days previously. Fresh supplies were rushed in and construction on a larger scale was commenced immediately. From that time forward progress has been steady. Production started in 1910 with \$35,000 and had increased by 1916 to \$9,398,000, which is 92% of Ontario's gold production. Ontario now occupies first place as a gold-producing province with a production of \$10,339,000, which is 57% of the total production of Canada.

This is only the beginning. Development has been most encouraging, and each year adds to the extent of the known ore reserves. There are now eight producing companies of which four are already paying dividends. The three largest mines, the Dome, the

Table No. 3. Total Production, Cobalt Mines, 1904-1916

Year	Nickel		Cobalt		Arsenic		Silver		Total
	Tons	Value	Tons	Value	Tons	Value	Ounces	Value	Value
		\$		\$		\$		\$	\$
1904	14	3,467	16	19,960	72	903	206,875	111,887	136,217
1905	75	10,000	118	100,000	549	2,693	2,451,356	1,360,503	1,473,196
1906	160	.....	321	80,704	1,440	15,858	5,401,766	3,667,551	3,761,113
1907	370	1,174	739	104,426	2,958	40,101	10,023,311	6,155,391	6,301,095
1908	612	.....	1,224	111,118	3,672	40,373	19,437,875	9,133,378	9,281,869
1909	766	.....	1,533	94,965	4,294	61,039	25,897,825	12,461,576	12,617,580
1910	504	....	1,098	54,699	4,897	70,709	30,615,181	15,478,047	15,603,155
1911	392	.....	852	170,890	3,806	71,609	31,507,791	15,953,847	16,199,346
1912	429	14,220	934	314,381	3,166	80,546	30,243,859	17,108,935	17,818,082
1913	377	13,326	821	420,386	3,663	64,116	29,681,975	16,553,981	17,051,839
1914	90	28,978	351	590,106	2,030	116,624	25,162,811	12,762,164	13,501,169
1915	35	28,353	206	383,261	2,490	148,379	21,746,534	12,135,816	12,695,809
1916	91	30,684	510	413,760	2,161	100,052	23,849,964	12,622,849	13,167,345
	3,916	130,202	8,723	2,858,956	36,201	816,035	259,257,153	135,809,222	139,611,415

of Cobalt and 30 miles West of the Government Railway. In the early winter the trail was crowded with an eager throng with pack-sack and toboggan, an occasional dog team being seen, and a genuine gold rush was in progress. A sleigh road was soon cut through to the new camp and the trip from the railway, that had previously taken three or four days to walk, could be made in one day by driving. Before Spring practically every claim for miles around the early discoveries was staked. It was fortunate that the best discoveries soon passed into strong financial hands, so that in the troublous days that followed, before actual production could begin, sufficient capital was available to continue development, without interruption. For some time progress was slow. Supplies had to be put in during the winter to run for the rest of the year.

The country was heavily wooded and the overburden frequently deep, so that prospecting was difficult and

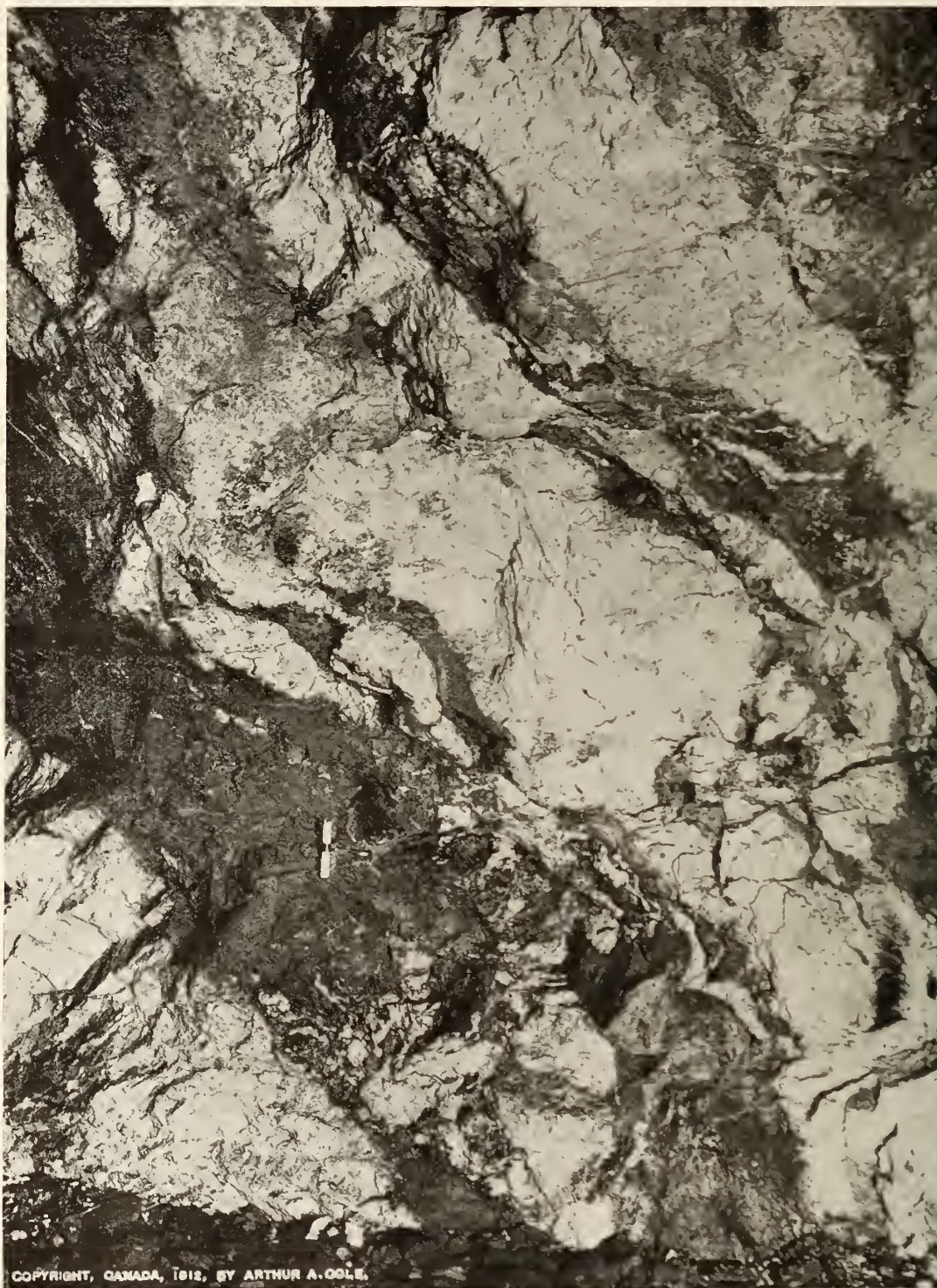
Hollinger and the McIntyre are making the Porcupine District famous. The Hollinger mine has paid \$7,456,000 in dividends to the end of 1916, and with the dividends of the Dome and Porcupine Crown a total of \$9,162,000 has already been reached. The McIntyre joined the list of dividend payers early in 1917 and the ore shoot it has developed on the 1000 foot level is one of the best in the district.

Other discoveries have also been made and new districts are coming into prominence. In Munro township, 50 miles east of Porcupine and 40 miles east from the railway, the Croesus Gold Mine shipped two tons of ore that contained \$35,500 in gold, and this along with \$40,000 to be recovered by milling was produced by sinking a small shaft 140 feet deep. At a depth of 300 feet development continues to be made. A factory and a mill is now being erected. At Kirkland Lake, 35 miles further south east, and 7 miles from Swastika, on the railway, several mines are developing, of which



the Tough-Oakes with its narrow rich gold veins, is already a dividend payer. At Boston Creek, 10 miles further south, rich gold ore has also been found, and already there is one small producer.

Then the water routes radiating in all directions from the railway, make transportation comparatively easy to prospectors and they also supply power in abundance for the development of the mines.



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A Porcupine Gold Deposit.

#### Mining Opportunities in Northern Ontario.

The Temiskaming and Northern Ontario Railway forms a main artery from which prospecting activity takes its start. Thus along the Temiskaming and Northern Ontario Railway from Cobalt to Porquis Junction, a distance of 125 miles, it was noticeable this year that there was hardly a station from which some mining operations were not being carried on.

The Ontario Government Railway was originally projected as a colonization railway but the finding of rich mineral lands in the country traversed opened it up much more rapidly than would otherwise have been the case. The happy combination of mineral and agricultural land in the district is of the greatest benefit to both, furnishing a cash-market to the farmer at his very door. New districts are being reported from



time to time, and the older districts are looking better as work proceeds.

The established mining camps form nuclei from which prospecting parties are sent out. Thus the finding of Porcupine may be directly attributable to the Cobalt Camp, and it was due to the exertions of men from these camps that important discoveries have been made along the Transcontinental Railway and also in Northern Manitoba.

Anyone who looked over the unbroken forest of Northern Ontario a dozen years ago and predicted that this district would soon be producing over 20 millions in gold and silver annually would have been put down as a fantastic dreamer, but that figure is surpassed to-day by 3 million dollars and the output is continually increasing.

And yet, only a small portion of the country has been prospected. Running north-east and north-west from Cobalt and extending to the Arctic Ocean is the great Pre-Cambrian Shield, the basement formation of the Continent. It contains thousands of square miles and offers to prospectors **Better Chances of Locating Valuable Mineral Deposits Than Can be Found in Any Other Country in The World.**

#### MAKING ENTRANCE EASIER AT QUEEN'S

Kingston, Ont., Sept. 20.—It has been decided by the Faculty of Applied Science of Queen's University that it is advisable during the period of the war to admit students with lower requirements in mathematics, namely, pass matriculation. This decision was brought about because war conditions have caused a larger demand for men with education in engineering, and it is evident that after the war there will be a call for more such men. It is desirable, therefore under these circumstances, to take measures to hasten the preparation of men for engineering work and to encourage young men to enter upon engineering courses.

The deficiency will be made up the first year by devoting a larger amount of time to mathematics, so that the total requirements for a degree will remain exactly the same.

#### DOMINION MOLYBDENITE CO.

The Dominion Molybdenite Co., operating the mine at Quyon, Quebec, has now in successful operation its own concentrating plant. The Callow cell is being used and the results obtained by the oil flotation process are said to be excellent.

Recent shipments of ore from the Iron Mask mine, near Kamloops, have been 105 tons for the week ended September 7 and 111 tons for ten days to the end of August.

In the lower Coast district, production at the Britannia Co.'s. mines is being continued on a large scale. The chief evidence of progress on Vancouver island is the recent re-opening of the smelting works at Ladysmith.

The Northport Power and Light Company has been organized to supply electric power and light to the Northport Smelting and Refining Company, operating the smelting works, now modernized, formerly owned by the Le Roi Mining Company, of Rossland, B. C. Current will be taken from the West Kootenay Company's main transmission line from its hydro-electric stations at Bonnington Falls, Kootenay river, B. C.

#### Investigation of Explosion at New Waterford

Following is the report of the commission which investigated the explosion which occurred in No. 12 colliery, New Waterford, on July 25th last:

Sydney, N. S., August 14, 1917.

To Hon. E. H. Armstrong, Commissioner of Public Works and Mines, Halifax.

Sir.—In accordance with the provisions of Section 44 of the Coal Mines Regulation Act, I beg to submit the following report with regard to the accident which occurred at No. 12 colliery of the Dominion Coal Co., Ltd., at New Waterford, N. S., on the morning of the 25th July, 1917.

You associated with me in this investigation the following gentlemen: Silby Barrett, miner, of New Aberdeen; Robert Baxter, miner, of Donkin; Thos. J. Brown, General Superintendent of the Nova Scotia Steel & Coal Co., Ltd., Sydney Mines; George B. Burchell, General Manager of the Bras d'Or Coal Co., North Sydney; Alexander Campbell, miner, New Waterford; Alexander McDonald, District Supt. of the Dominion Coal Co. Ltd., Caledonia; Wm. J. McKay, mining checkweighman, New Waterford; Norman McKenzie, mining engineer, Glace Bay; Neil A. Nicholson, Deputy Inspector of Mines for the Sydney Mines inspection district and Alfred J. Tonge, M. E., General Supt. of Mines, Dominion Coal Co. Ltd., Glace Bay, who acted with me in taking the statements of the witnesses heard, made lengthened examinations of the No. 12 mine on the 31st July and 1st August, 1917, and concur with me in the report which follows:

We held our first meeting on the morning of the 31st July, in the Dominion Coal Company's office, No. 12 colliery, New Waterford, and decided to enter the mine for the purpose of examination, which we did, and spent the remainder of the day in examining parts of the mine affected by the explosion. On the following days, August 2nd, 3rd, and 4th, we examined witnesses at New Waterford, and adjourned until Thursday, the 9th of August. On August 9th and 10th, examination of further witnesses was resumed at Waterford. On August 11th, we met in Sydney to consider the evidence taken. We found it necessary to obtain further information relative to the direction and effect of the forces of the explosion at a particular point in the mine, and for this purpose, and in order to facilitate the work in hand, a number of the assessors were selected to make a further examination and report; work on the preparation of our report being resumed on the 13th, in Sydney. On Tuesday, August 14th, we all met in Sydney to receive report of special committee that were visiting the underground workings in No. 12 colliery, and to prepare and complete our report.

The explosion which caused the death of sixty-five men and boys occurred in the west side of the Dominion Coal Company's No. 12 colliery, on the Victoria Seam, at New Waterford, about 7.30 on the morning of Wednesday, July the 21st, 1917.

Our duty appeared to us to be: to determine in what part of the mine the explosion originated; what was the cause of the explosion, and to suggest such recommendations as would make for greater safety in the future.

#### Origin of the Explosion.

To reach a conclusion as to where the explosion originated presented many difficulties, and it was necessary that a most careful examination should be made,



and that this examination should be completed before the evidences and traces of the effects of the explosion in the mine were obliterated.

A careful and searching examination by all of the assessors was therefore undertaken during the days of July 31st, and August 1st. Plans were prepared upon which were marked the direction of forces, which indicated the path of the explosion as observed by us, and later confirmed at important points by a number of the witnesses.

In a cross-cut in No. 3 room east of No. 2 long balance, No. 6 west level, a shot had been fired on the morning of the 25th of July, 1917. This place was found to be 7 ft. 4 inches wide, measured across the face midway between the roof and pavement. The place was undercut all across to a depth of 6 ft. 10 inches, slightly "gripping" in each rib. Two wall holes were found bored, one near each rib; the holes were well placed with sufficient clearance from wall and roof and of a depth corresponding with the depth of the mining.

The shot on the east rib had been loaded and fired, but had not brought down the coal as expected. To ascertain the condition of the coal and the effect of the shot, it was decided to have the shot opened up. A shearing was put in about one foot from the hole toward the center of the place, and the shot was opened out and it was found that the back part of the coal was affected by the explosive. The back was found well cut and the east rib was cut to a point 35 inches from the face of the coal, leaving the whole face of the coal, a thickness of about 35 inches, entirely undisturbed.

A marked cleavage was noticeable parallel with the face cleat directly inside of the 35 inches of the undisturbed face coal. Some of the tamping was found intact in the hole in the undisturbed portion of the face coal showing conclusively that no part of the force of the explosive had escaped by way of the shot hole.

From all the information gained by shearing out the shot hole in which the shot was fired we came to the conclusion,

FIRST—No second shot had been fired in the hole.

SECONDLY—That the hole was well placed.

THIRDLY—That from measurements taken there was no indication of the hole having been too heavily charged.

From the foregoing we come to the conclusion that a part of the force of the explosive escaped as flame down the cleavage already noted, and out through the mine, carrying with it matter in a state of ignition promoting a gas, or gas and dust explosion.

A part of the force of the explosion passing up No. 2 long balance died out quickly on reaching No. 4 level; the probable cause of this was having only one opening on the long balance between rooms Nos. 8 and 13, and finding no material in that direction to accelerate its force. The part of the force which went down the long balance and in and out of No. 6 level and down through the balance on to and out of No. 7 level covered a much larger area, and was propagated by dust or gas or both.

After giving this matter the most careful and serious consideration, and hearing all whose evidence we felt would be helpful in the enquiry, discussing and studying every phase of the matter and every suggestion as to other possible originating points we have arrived at the conclusion that all the indications of the forces point to the initial explosion occurring on the west

side of the mine in cross-cut number one, partly driven between rooms Nos. 3 and 4 on the east side of what is known as the long balance number two on number six level.

#### Recommendations of Investigators.

In view of the evidence touching this lamentable accident, we beg to submit the following recommendations, and trust that your honorable government will, in the interests of the safety of life, approve of the issuing of instructions or the enactments of legislation that will give these recommendations effect:

Where balances, cross-cuts or other single places are driven, we recommend that to prevent accumulations of gas a more effective means of directing the air to the faces should be adopted than the practice we found in some cases obtaining in No. 12 colliery.

The deputy inspectors should be instructed to accompany as often as necessary mine examiners on their regular examination rounds, to satisfy themselves that such examinations are made within the time required by the Coal Mines Regulation Act, and that the reports of such examinations are in strict accordance with the facts as found.

The Coal Mines Regulation Act should be so amended that the examiners shall be required to state the approximate quantity of gas when found in any of the places they have examined.

#### Heroic Rescue Work.

In concluding our report, we desire to place on record that acts of the greatest bravery and endurance were performed by all those who volunteered for the work of rescue. The dangers to be encountered were known to be great, but as long as there was life to be saved, there was no lack of volunteers, who, unflinchingly faced the dangers to the limit of their endurance or succumbed in the attempt to save the lives of their fellow men.

It is with extreme regret that we mention that three young men, impelled by the highest conception of their duty to save the lives of others, lost their own in the attempt. In this connection we especially mention the names of John McKenzie, Philip Nicholson and Karl Pietchick.

We extend our deepest sympathy to all those who have been bereaved by this most regrettable calamity.

Submitted herewith are the following documents and plans: Exhibit A.—A plan showing in red the route travelled in the mine by the assessors. Exhibit B.—A plan of the whole mine, showing where the bodies were found. Exhibit C.—An enlarged plan of the long balance, where accident occurred, showing in detail the cross-cut in No. 3 room. Exhibit D.—Names, numbers and occupation of the victims of the explosion. Exhibit E.—Document giving particulars of shotfirers' and overmen's meeting. Exhibit F.—Copy of examiner's report book July 1st to 25, 1917. Exhibit G.—Copy of overman's report, July 3, to 24, 1917. Exhibit H.—Copy of shotfirer's report book, July 3, to 24, 1917. Exhibit I.—Barometer chart, Monday, the 23rd of July to Sunday the 29th. Exhibit J.—Memo of examination of lamps. Exhibit K.—Dominion Coal Company's special rules. Exhibit L.—A plan showing points where samples of dust were taken for analysis; attached are the analyses. Exhibit M.—Plan showing direction of forces at the time of the explosion. Exhibit N.—Copy of evidence taken at coroner's inquest. Exhibit O.—Evidence taken under section 44, Coal Mines Regulation Act. Exhibit P.—Copy of special report of assessors who again visited the mine on August 13th.

# Gas Explosions in Crowsnest Coalfield

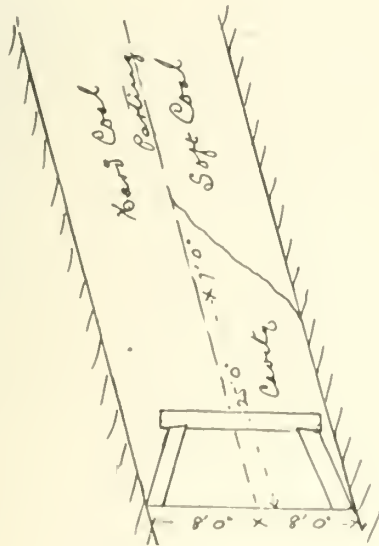
By James Ashworth.

In 1904 the writer contributed a paper to the Manchester Geological and Mining Society on Outbursts of Gas at the Morrissey Collieries owned by the Crows Nest Pass Coal Co. Ltd. In continuation he may say that after closure of No. 1 mine work in this part of the coalfield was not resumed until 1907, when a new mine known as No. 7 was opened up. This mine was lower down in the coalfield section than No. 1 mine, and had an overhead cover of about 800 feet. It had a steep angle of dip (65 to 75 degrees) and a total thickness of 32 ft. Only about 16 ft. of the footwall portion was worked, and in the middle of it there was a natural parting, separating the two 8 feet portions, the bottom half being of harder nature than the top part. The mine was ventilated by a forcing fan, and therefore the main haulage road became the return airway.

The first serious outburst of gas in No. 7 mine occurred at the face of the main level on the 27th of January 1909, filling the level with small coal for a distance of 15 feet from the face. The large volume of gas given off was sufficient to extinguish a safety lamp 30 feet outside the main entry, and yet a horse which was left inside by its driver was afterwards found alive.

The second outburst occurred in the upper counter level, about 1550 feet from the outside, on the 19th of April, displacing 15 tons of dust coal and accompanied by a considerable volume of gas.

The third outburst took place on the 5th of May, in a raise in the soft coal between the main entry and the upper counter level. This raise was up about 25 ft. and 14 ft. back from the face. Two men were at work in the raise and had evidently attempted to escape,



as one was found on the timber at the bottom of the raise and the other in the level below; both having been smothered by gas and dust. Only about six tons of coal dust was displaced. It may be noted that both the level and upper counter were open for several yards past the place where the raise was being driven up.

The fourth outburst occurred on the 19th of May, at the face of the main entry, soon after the miners had completed a setting of timber. A cracking sound warned them and they escaped to the outside without injury.

The writer visited this mine about a month after the outburst, and found that the displacement of coal had been almost entirely from the upper or softer part of the seam, and that the cavity extended upwards about 25 ft. above the top of the timber, and also into the solid coal at the face and tapered off into a triangular form in the last six feet. Below that the cavity would be about 8 feet square. The amount of coal displaced was 75 tons and the volume of gas given off during six hours was estimated to have been 750,000 cubic feet. After this outburst an enquiry took place. The management and three Government officials decided not to advance the levels any further as there seemed to be no certain means of anticipating these outbursts. The mine was not however closed down immediately, and some of the upper pillars were worked until the railway company which was using the coal for its locomotives found it was too small sized to suit their requirements. Moreover, the other collieries at Coal Creek and Michel were able to supply all the coal which the market needed. The coal seams of this part of the coalfield having been much altered by crushing and heat, would not make a good metallurgical coke and this formed a further reason why operations were suspended.

Up to the date of writing outbursts of gas of such great intensity have not occurred at any of the other collieries in this coalfield, and therefore it would seem that at Morrissey the special conditions of heat and pressure to which this end of the coalfield has been subjected have not yet been found in other parts of the field. The nearest approach to these disturbed conditions has been met with in the workings on the south side of Michel creek, where the strata is much disturbed by a severe twist in the dip of the strata. In this portion of the coalfield very large volumes of gas are driven off, practically continuously, as set out in some detail in a paper read by the British Columbia Chief Inspector of Mines before the U. S. A. Mine Inspectors' Institute, at Joplin, in June 1916. He then stated that in Old No. 3 mine, on the east side of the slope as much as 15,695 cubic feet of methane had been given off, per ton of coal mined, resulting in the whole of the return air current being charged with methane to the extent of 2.66 per cent, as ascertained by actual analysis at Ottawa by Dr. E. Haanel. In the same part of the mine, when it was not at work, the percentage of methane in the air was 2.18. In the whole of the return air current of 60,000 cu. ft. per minute the methane content was 1.83 per cent when the mine was not at work.

In No. 3 East mine it is noticeable that the greatest yield of methane was from the west side, and it would therefore appear that the special condition which caused these abnormal emissions of methane must be situated somewhere between the Old No. 3 and No. 3 East. On the 3rd of August 1915, when the mine was at work, the west side split contained 3.33 per



cent. of methane or as calculated gave off 7,392 cubic feet per ton mined.

The highest reported percentage of methane per cubic foot of air, found whilst the mine was at work, was 3.83 in Old No. 3 mine.

These mines were worked by two shifts of eight hours each, and the average volume of methane per ton of coal mined, calculated from mine samples of the main returns, was 4,326 cubic feet.

These figures are certainly extraordinary, and it is not surprising to find that when an explosion occurred on the 8th of August 1916 in No. 3 East mine, that so very serious was the damage to the mine that the body of one of the men killed has not yet been recovered.

The average thickness of No. 3 mine is given as five feet, and of No. 3 East as eleven feet. Both seams are bituminous and of excellent coking quality without washing.

The analysis of the coal from No. 3 mine is stated to be: moisture 1.01; volatile combustible matter 20.95; fixed carbon 71.00 and ash 7.04. Both of the coals named are very friable, and the use of explosives in getting them is limited. The overhead cover is about 1200 feet, in which thickness there are several other workable seams. It would appear however from the data thus far collected that the main volume of the methane emitted is principally built up in the whole or some part of the coal seam itself.

Whilst making analysis of the gases occluded in the coals from this coalfield it has been discovered that they consist in part of gases of the higher hydrocarbon series and that the gas usually described as fire damp is not necessarily methane only. This is a very important point to take into account, and in 1904, the writer came to the conclusion, that some part at least of the gas given off in the large outbursts, is "wet" gas, and similar in every way to the wet gas given off, say at the Dingman oil well in Alberta, and from which some percentage of gasoline is or was collected. The writer believes, as he did in 1904, that some of the gases in the coals are in liquid form, and thus when the restraining pressure is reduced as the covering coal is removed, they volatilise and force away the coal in the finest of dust, and in this manner fill out the long cavities of irregular form, which remain after an outburst has been dissipated. It is very noticeable that the dust found in these mines under ordinary circumstances is of a very greasy nature, and that the higher hydrocarbon gases are found occluded in it.

Sudden outbursts of gas have received comparatively little notice either in British Columbia or elsewhere, but in May, 1909, a bulletin of the Canadian Mining Institute contained an interesting paper by Mr. D. B. Dowling of the Dominion Geological Survey staff, on "Some Possible Chemical Changes in the Formation of Coal" he says: "Experiments with pressure alone do not give results, since great periods of time are required; but when implemented by heat, there is evidence that there is a chemical change made by which the increased percentage of carbon is attained with very little actual loss of carbon. . . . That there is an increased tendency to throw off gas with the rise in carbon percentage is acknowledged; and when it has reached its maximum the coal might in some instances be classed almost with such unstable compounds as explosives. There are accounts of slight shocks producing "blow outs" of large dimensions in mines of

the higher bituminous coals. This liberation of gas need not be considered as coming from pockets of compressed gas; but as following much the same course as an explosion of dynamite, which is simply the rapid rearrangement of atoms. It would seem probable that the formation of gas was accompanied by a concurrent formation of a more stable coal compound and when the alteration was violent the stable coal was brought along with the gas as dust. Dust not formed in this way but from the operations of mining and handling the coal should be considered more as a series of minute particles of unstable compound borne along by a small gas atmosphere of its own making, and therefore not easily laid by sprinkling, and only to be got rid of by ventilation."

Unfortunately this paper of Mr. Dowling's, as far as regards the above quotation, did not elicit the least comment, and has remained as a dead letter.

In the annual report of the British Columbian Minister of Mines for 1909, the Chief Inspector of Mines, Mr. Frank H. Sheppherd, remarked that: "the question of dealing with these outbursts is the most important and difficult problem to cope with in this field. If this portion of the field is to be worked at all, it must be under conditions which will give the miner some chance for his life. Most of the outbursts in this field have been attended with loss of life. The whole question devolves upon the possibility of relieving the pressure ahead of the working face. If this cannot be done, it would be inhuman to ask or allow a miner to take chances such as are not experienced in any other industry. If the field is valuable and this may be readily conceded, it would appear that the operator could go to considerable expense in experimental work, having for its object the safe winning of the field and the protection of the lives of those who may engage in its development, and it would be a reproach to modern engineering skill to admit that the problem will not admit of a reasonably safe solution." (page 225).

When we wish to cure a disease the first and most important point is to correctly diagnose it, and so it is in this serious problem of sudden and violent outbursts of explosive gases we need if possible to find out when to expect them and secondly how to deal with them in safety. The need of experimental research into practical matters of this sort needs no emphasizing, because the lives of hundreds of miners may depend on their solution, and moreover, it may be anticipated that the problems will increase in importance as the mines extend further away from the entries, and where very large areas of goaf are closed off.

Up to the present no system of working has been consistently followed. Pillar and stall has been the usual method, and this has introduced the question of the proper size of the pillars, especially where "bumps" have been of frequent occurrence. In the latter cases it cannot be averred with any confidence that the very large pillars have given any better results than the medium or small pillars; but there is no doubt in the writer's mind that no system has given such good results as long wall. There are many instances where pillar and stall has been the system adopted, then changed to long wall, and again changed back to pillar and stall. In some cases the reasons given for the adoption of pillar and stall have been that this system gave the minimum of expense in moving dirt, in another case that there was not sufficient material to form substantial packs, and where there was material



with which to build packs, that the cost of making them was entirely prohibitive, due to the insistence of the miners' union officials that the miners should receive a fixed price per inch thick, per square yard, for "clod." It is of course possible to have a special gang of men to build the packs; but where it is possible it is better for the miners to build their own packs. In long wall working it is of the greatest importance to control the settling down and breakage of the roof, so as to maintain as regular a pressure as possible on the coal face.

In long wall working where gas in the floor gives trouble, it naturally escapes over a large area, and does not break out in sudden and dangerous volumes, as it frequently does in pillar and stall working.

Dangerous "bumps" seldom occur in long wall working after the first roof break has occurred, and therefore it is fair to conclude that bumps are mainly due to a combination of roof settling, and the effect of gas in the floor. As there are several modes of working a mine on the long wall principle it is necessary that the management should choose the one which best accords with the cost of extraction, and not to be in a hurry to change the mode of working because a few heavy settlings of the roof may occur. The success of long wall working depends on the regularity of the breaking down or bending of the roof, or as it is often described "roof control."

The long wall method of mining coal has another most important feature to recommend it, viz., that the mine is much easier to ventilate and therefore much safer, and requires less brattice cloth.

In long wall working the greatest trouble is experienced when the roof and floor are "very good," but they must be made to either bend or break.

In mines such as those in the Crows Nest Pass coal-field it is advisable in many cases to drill holes in the floor, particularly where rolls or faults are met with, and thus relieve the tension of the floor gas.

From the soft nature of most of the coal seams in the Crows Nest Pass and the absence of "backs," "slides" and natural partings, which are common in many coalfields, these coals drain very slowly and this fact is a principal cause of the abnormal outbursts of explosive gases.

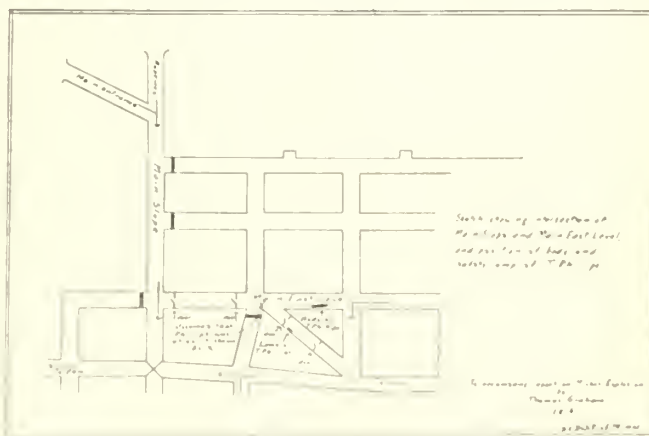
Since writing the foregoing notes the official report on the explosion in No. 3 East mine at Michel, on the 8th of August 1916, has been published in the Minister of Mines Report for 1916. This describes that the explosion occurred during a heavy thunderstorm, and shortly after the night or repair shift had gone in to work at 11 o'clock, and from the self recording card of the fan water gauge it is calculated that the explosion occurred about 11:20. No one outside the mine actually heard the explosion, or if they did, the noise was assumed to be caused by thunder. A miner who had just come out of the mine, and was on his way home, did not realize that an explosion had occurred.

The discovery was not made until the fan engineer who had two fans under his care visited No. 3 East fan and found wreckage in the engine room, and other evidence of an explosion. The main entry to the mine was completely closed, and the explosion party had to go in through an old prospect opening. A fire in the main return airway from the east side was fortunately discovered and extinguished without further disaster. The body of the fireboss was found some distance away from the remains of his safety lamp. It

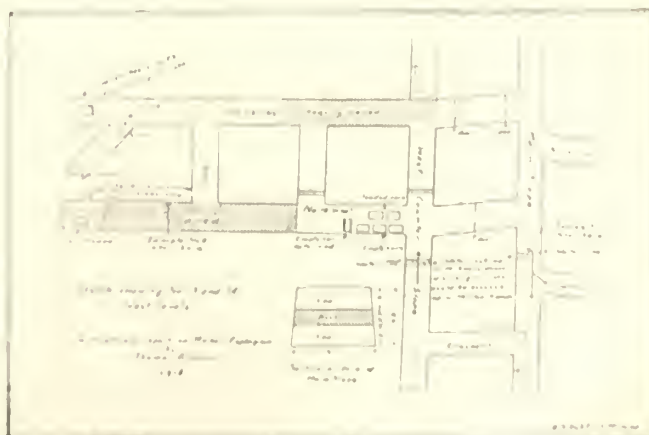
was assumed from this and other indications that the force had come from the main slope and not along the return airway. "The gauzes of the fireboss' lamp were badly crushed and showed evidences of alkali stain, as of the lamp having been heated." This would suggest that he had met with gas in the return air as soon as he passed through the main separation doors; but his death was due to violence and not to burning, as his hair was only slightly singed.

The evidence showed that the miners had only just reached their working places, when the explosion originated. Thus the miners working in No. 6 slope face, had undressed and put down their dinner pails and then returned to No. 13 parting to assist in re-railing a car left by the previous shift. It is in this part of the mine that there appears to be the best evidence of the point of origin of an explosion,—thus the brattice at the face of the slope was only slightly disturbed, and in the raise of the counter slope off No. 17 room was standing intact.

As to the cause of this explosion and its point of origin, the published report of the British Columbian Minister of Mines (1916), affords the following leading facts: (1), that the weather conditions were those of a violent thunderstorm, and it was at one time assumed that lightning was the cause of the explosion yet the report of the Chief Inspector of Mines does not take this view, and leaves the cause and point of origin an open question. (2) The first body found inside the mine was that of the fireboss which was inside the separation doors. The gauzes of his lamp showed evidences of having been heated and from this fact the natural inference would be that the return air was highly charged with firedamp, he having only just



Intersection at Main Slope and Main East Level.



No. 13 and 14 West Levels, Michel Mine.



entered the mine. The lamp was smashed by mechanical force and apparently his body had been thrown some distance inbye on the return air road by a force from the main slope which was the intake airway. (3) the evidence of force in this slope showed that practically all the strong air stoppings had been blown inwards, that is towards the return airways. Referring to the plan it would appear that the main force was developed in the west side workings below No. 8 west level and found vent for its expansion up the Main Slope. Only one man's body was expected to be found in this part of the mine; but it has not yet been discovered. No. 6 East Slope which branches out of the Main Slope about half way down, showed evidences of a downward force, but all upwards in the counter slope. In the main return from this district the indications of force were all inbye from the fireboss' body, and the plan shows the meeting of these forces at No. 14 room. It is particularly noticeable that not a single one of the bodies of the men found, had been badly burned, and that the evidences of heat found on the four men in the main slope were only slight singeing and blisters as if caused by steam. Those men not killed by direct violence appear to have all died from carbon monoxide poisoning. (4) There were however several noticeable features near the foot of the No. 6 east slope, viz., (a), that at the face and also in No. 17 room the brattices were not blown down; (b), that the lamp of a miner named Davis one of the miners who worked in No. 17 room, was found hanging on a prop near the face, and "was found as clear from dust and smoke, as when issued from the lamp room"; (c) that this miner and his mate were the only men who had moved any distance from their working place. The question now arises as to what may be inferred from these conditions and the answer is, that they were just the conditions which an experienced investigator would expect to find at the place of the origin of an explosion. The non-disarrangement of the brattices shows that no force such as was developed in other parts of the mine was developed below No. 15 room and that although there was evidence of heat and coking of dust at No. 15 room, yet the two miners attempting to escape from No. 17 were killed by carbon monoxide poisoning only. The next very important point is that the men working at a derailed car in No. 13 do not appear to have had any warning of approaching danger nor had any of the other men. The lamp of Davis left hanging in No. 17 possessed the precise signs which are left in a safety lamp after it has failed under such conditions to be a safety lamp, and has passed the flame of burning gas to the outside, viz., clean gauzes and the coloration which indicates that gas had been burning inside.

The writer would conclude from these positive and undeniable facts that although the evidence of the direction of the forces of the explosion were apparently UP the main slope to the surface and from the main slope DOWN the No. 6 East slope and also from the Main slope EASTWARDS along the main return air way into No. 6 East district, yet that the original explosion first passed up the No. 6 east slope and counter, and then both DOWN and UP the Main slope. The force of this argument will be better realized when the effects at the foot of the Main slope, where coke dust was in abundance as well as great mechanical force present, are compared with the indications at the foot of No. 6 East Slope, where there was neither mechanical force nor coking. It would therefore ap-

pear that the great force developed in the top half of the Main Slope was the joint result of an original ignition and explosion of gas at the foot of No. 6 East slope, which in its turn, ignited coal dust and carried the flame into the western district which below the fault was more gaseous than the No. 6 east district. Careful measurements of the main return air current from this mine showed that the air was saturated with moisture; that its volume was 120,000 cubic feet with a velocity of 1,500 cubic feet per minute; that 2,194,560 cubic feet of methane was given off during a working day, when 550 tons of coal were gotten, or at the rate of 3,990 cubic feet per ton of coal mined. The volume of methane produced was calculated from the analysis of samples of air taken in the main return.

Whilst testing samples of air from the Michel colliery, the Dominion Government analyst Dr. Haanel has proved the presence of hydrogen, and found indications which have shown "that hydrogen is not an uncommon constituent of mine airs." The presence of ethane has also been estimated as being one tenth of the methane present.

To those who have seen safety lamps tested in mixtures of hydrogen and air, and also in mixtures of methane and air, it is not difficult to realize what dangerous conditions may arise when a miner entering his working place immediately hangs up his lamp on a prop without first making a test for gas. Miners as a rule do not appear to appreciate the importance of observing the law in this respect, as was shown during an enquiry into a more recent explosion in the same district.

Assuming that the writer's deductions as above are correct it is more than probable that when the Coal Creek No. 3 mine is cleaned up to the face of the main and counter levels that the origin of the explosion which occurred on the 5th of April 1917, will be found to have been a bonneted Marsant safety lamp.

The safety lamps in general use in British Columbia are of the bonneted Wolf Marsant type, burning gasoline or benzene. With regard to their safety it is to be noted that M. Marsant, whilst making his long series of tests by raising his double gauze bonneted safety lamps into a quiescent explosive mixture of gas and air, did not consider such lamps as absolutely safe, and hence he added a third superimposed gauze which is the true construction of the Marsant safety lamp.

It must be obvious to every reader of these notes that the necessity for devising some means to ensure the better protection of miners' lives has now been amply demonstrated and the writer therefore submits in conclusion that the time has arrived when these dangers ought to be carefully looked into by a Special Research Commission or Committee and at as early a date as possible. And finally that the system of developing and extracting such seams of coal as those referred to should be defined by such Commission and strictly enforced by Act of Parliament.

There is much activity at the Canada Copper Corporation's property on Copper Mountain, in Similkameen district. Considerable quantities of material are being hauled by wagon from the railway at Princeton, and preparations for putting in a 3000-ton-a-day concentrating plant are stated to be in progress. A recent report is to the effect that work is to be resumed at the Coalmont coal mine.

### Mr. Geo. H. Rice Recommends Permanent Commission For Crowsnest Coal Mines

Victoria, B. C.—In a short time announcement will be made by the minister of mines, Hon. William Sloan, as to what steps will be taken to meet as far as possible at present the recommendations contained in the report which George H. Rice, chief engineer of the United States bureau of mines, has made after full investigation of conditions in the coal area of the Crow's Nest pass section.

Following the "bumps" which occurred in 1916 in No. 1 mine of the Crow's Nest Coal company at Fernie, when miners were killed, the then government decided to engage Mr. Rice to make a complete survey of the field where, on a former occasion, in 1907, in No. 2 mine, the phenomena of "bumps" had occurred claiming the lives of a number of men, and necessitating government action to the extent of prohibiting operation of a portion of the mine field then being worked. In company with the then chief inspector of mines, Thomas Graham, now superintendent of the Canadian Collieries, Dunsuir, Limited, and provincial mineralogist, W. Fleet Robertson, Mr. Rice visited the Fernie field in October last, and the result of his investigations has been in the hands of the present minister of mines, honorable William Sloan, for some months, but pending a decision as to what action should be taken upon the expert's recommendations, the findings have not been given out.

#### Coal Mines Are Gaseous.

Mr. Rice reports upon the phenomena of "bumps," and states that the Crowsnest pass fields as shown by the tests, are among the most gaseous in the world, and he recommends among other steps to be taken to overcome the adverse conditions, methods of mining to relieve the pressure, to which, he states, the "bumps" are due, the appointment of a permanent commission to be on the spot and conduct extensive tests continually, and advise the operators in their work of mining.

It is on this point of a permanent commission that the minister of mines has hesitated, as the expense connected therewith would be heavy. It is probable that, for the time being at least, a permanent chemist, competent to make tests of gas, etc., will be employed, and the larger question of a commission will be allowed to stand over. But many of Mr. Rice's recommendations along other lines will be approved. In fact, some of them are already being adopted by the mine owners. A summary of Mr. Rice's findings sets forth:

#### An Important Field.

The Crowsnest field is regarded by Canadian geologists as the most important field in British Columbia. It presents unusual natural difficulties, because the coal beds are at the base of elevated plateaus, and it is impossible to reach coal except through outcrop, also, the coal is under heavy load, requiring great care in mining to prevent "squeezes" and "bumps." The coal beds are very gaseous; that is, have large methane (fire-damp) flows at Coal creek and Michel, and at Morrissey the outbursts are unequalled except in certain mines in Belgium.

#### "Bumps."

"Bumps" are not related to gas outbursts, but they may occur, as in the state of Washington and Great Britain, where overlying rocks are rigid and where there is a great weight of cover, and when mining has either extracted too much coal in advanced mining or it has not been taken out completely starting from the

outcrop, which would break the overlying rock in successive slices and thus prevent "bumps." "Bumps" are believed to be caused by subsidence of roof in certain areas under rigid rocks, leaving a great unsupported span of rock stratum. When one of these has given way, it means the hammerlike blow of thousands of tons striking on the immense roof or flexible stratum overlying the mine, which imparts the blow downward, breaking timber, causing extensive falls in the mine, and sending rock tremors through the strata.

Improper mining in No. 2 mine was the cause of "bumps" in that mine in 1907-8, and, in turn, the subsidence over this area affecting the strata higher up caused the recent "bumps" in No. 1 mine. "Bumps" may occur in the future over the same area but it is probable with decreasing force, as the rock stratum broken down in each case has less distance to fall, has less load and is more distant in heights above the mine.

If the measures adopted are carried out, viz., of taking out less than 15 per cent of coal on the advance and taking down the rash and roof coal in the working places in No. 1 mine, there is comparatively small danger to life for the men employed underground.

To give warning of impending outbursts of gas in certain dangerous zones with the advance of the working places long drill holes should be kept drilled in advance. To provide for the regular flow of methane, well kept-up airway of large area and powerful fans should be employed with ample margin or capacity. A permanent commission should be formed to further investigate and review the evidence collected by members of the commission, the inspectors of mines and others, having among its membership a geologist, a mining engineer, a chemist and an experienced mine operator.

The problem of equal importance, Mr. Rice reports, in working the Crowsnest field coals and especially in future developments under deeper cover and greater distance from the outcrop, is to adequately take care of the large quantity of gas. Very wisely the mines are not allowed to equip with electricity for haulage or lighting as the danger is too great. The following are the chief facts developed:

1. That the flow of gas as measured by the analysis of the returns and the outbursts of gas which occurred at the Morrissey collieries show that the Crowsnest Pass coal field mines are among the most gaseous in the world.

2. That gas is derived from two sources: (a) Stores in the crevices and joint planes of rocks and coal; (b) Occluded, or that held in the pores or cells of the coal by surface tension.

3. That an unusual condition has been found in testing the amount and kind of gas given off by the broken coal, which, on the basis of one sample shows (a) that an unusual quantity of hydrocarbon gas is given off by the coal on grinding fine by vacuum; (b) that three times as much ethane and other hydrocarbons are given off as methane under these conditions.

4. That the gas pressures within a short distance of the face of the workings are low, which, however, is no proof that high gas pressure may not exist at a considerable distance in the solid away from the face.

Mr. Rice has submitted recommendations as to the best method of draining the coal measures of gas and, in connection with his recommendation of the appointment of a permanent commission, state that there are obscure matters which can only be cleared up by further and continued investigation such as research work on gases, the recording of phenomena such as rock tremors, "bumps" and outbursts and the trial of methods of



mining. Such a commission would make a careful topographical survey in the vicinity of the operating mines and the establishment of monuments in advance of mine workings by precise methods of surveying so that all the changes may be observed; the establishment of seismographs registering vertical waves at two or three points on the face of the mountain above No. 1 south mine; the carrying on of experimental methods of mining of coal at the face in a practical manner, especially No. 1 bed so as to lessen the danger in case of "bumps" and to look into the best methods of timbering for protection; to determine the amount of occluded gas in different coal beds, to continue the excellent investigations initiated by the provincial inspection department into the question of fire damp by the gathering of samples of mine air; to record gas pressures, etc.

Mr. Rice points out in his report the greatest function of such a commission would be to determine how the collieries may be so laid under the difficult conditions, which confront mining operations in the Crowsnest field, that all the coal that is now considered as "reserve" may be ultimately obtained. When it is considered, he states, that it is practically impossible to sink shafts into the large part of the field and that, if the coal has to be attacked from the outcrop, to mine in the interior of the field will require entries or tunnels six, eight or ten miles in length, the magnitude of the problem is apparent.

## PERSONAL AND GENERAL

Dr. W. F. Ferrier was in British Columbia about the middle of August.

Mr. Oscar Lachmund, of Greenwood, Boundary district of British Columbia, general manager of the Canada Copper Corporation, was in Seattle, Washington, early last month.

Mr. Wm. Lancaster has been appointed a district inspector of mines for the Province of British Columbia, with headquarters at Fernie, in the Crowsnest district, Southeast Kootenay.

Mr. Charles Camself, of the Geological Survey of Canada, was at Copper Mountain, Similkameen district of British Columbia, last month, bringing his knowledge of that locality up to date, many important developments having taken place during the last year or two chiefly as a result of the exploratory and mining operations there of the Canada Copper Corporation.

Mr. J. T. Shaw, manager of the Hargraves mine, Cobalt, was in Toronto last week.

Mr. J. A. Reed, of the O'Brien mine, has sampled the Preston claims in Deloro township.

Mr. A. J. McNab, formerly superintendent of the Consolidated Mining and Smelting Co.'s smelter, but now of Nevada, has been visiting old friends at Trail, B. C.

Mr. D. B. Morkill, of Hazelton, B. C., has been appointed superintendent of the Hazelton View mine, in Omineca mining division of British Columbia, in place of Mr. Duke Harris, who will investigate ore occurrences of Sibola region, also in that part of Central British Columbia.

Mr. Ernest Levy, for a number of years manager of the Josie group of mines in Rossland camp, British Columbia, owned by the Le Roi No. 2, Ltd., of London, England, has taken over the mining engineering practice of Mr. J. V. Richards, of Spokane, Washington, who has volunteered for service in the United States army.

## SPECIAL CORRESPONDENCE

### NORTHERN ONTARIO.

#### Mining Corporation.

Mining Corporation of Canada is producing bullion at the rate of nearly five million ounces annually. Close to 410,000 ounces of silver is being produced every thirty days. Mining costs will show a little increase over the 1916 period owing to the extra cost of supplies and the added bonuses to the men's salaries. However, taking everything into consideration, it would appear that the current twelve months will be the most profitable period yet experienced by the Mining Corporation.

#### Nipissing.

Production from Nipissing for the month of August exceeded all previous records for the present year. The company mined ore of an estimated net value of \$293,116 and shipped products from Nipissing and customs ore of an estimated value of \$588,254. No new veins were encountered during the month; but all old sources of supply continued to prove satisfactory, several of the stopes proving to contain more ore than was originally anticipated. A number of new working places were started, some on exploration and others developing promising veins encountered during previous months. The high grade mill treated 32 tons and shipped 640,092 ounces of fine silver. The low grade mill treated 6,395 tons.

#### Pittsburg-Lorrain Operating Wettlaufer Mill.

The mill at the Wettlaufer mine has been leased by the Pittsburg-Lorrain mining company and is now in full operation. The capacity of the mill is around thirty tons per day. For the present the mill will be treating low grade ore which will run about twenty ounces to the ton. This should give a recovery of approximately \$18,000 per month. Besides this low grade ore the company has a quantity of high grade and a car is being made ready for shipment at the present time. Ore at the Pittsburg-Lorrain as so far determined has been in pockets. From one pocket between the first and second level approximately \$30,000 worth of silver was mined. This pocket was about twelve feet long, fifteen feet deep and about three inches in width and of a very high grade of ore. Some of the ore recovered at this pocket contained fifty per cent. of silver. About six hundred pounds of this ore has been found.

#### Genesee.

The main shaft of the Genesee mine, adjoining the Chambers-Ferland property of the Cobalt Alladin mining company, has reached a depth of 572 feet where the contact of the conglomerate formation with that of the lamprophyre was encountered. It was along this contact that the Chambers-Ferland encountered such excellent results, and with the expectation of cutting the vein system of the Chambers-Ferland a station has been cut at the 550-foot level of the Genesee and lateral work commenced. It is thought the chances of the latter property having the extension of the Chambers-Ferland veins are very good.

#### Kerr Lake.

Kerr Lake production for the month of August amounted to 200,855 ounces. The increase in the rate of production for the present year has been approximately 59,837 ounces. When the increased value due to the high price of silver is taken into consideration it will be readily seen that Kerr Lake is having one of the most prosperous years in its history, and some pleasing surprises are likely to be in store for shareholders in this wonderful mine.



### National's Oil Flotation Plant.

At the National Mines the oil flotation plant is now treating approximately seventy tons per day. Due to defects in equipment more or less difficulty was encountered in getting this plant in operation. However, at the present time everything is running smoothly and a high recovery is being made from the old tailings. Underground mining operations have been suspended for the past month or six weeks, but arrangements are being made for a resumption of this work early in October. Exploration work will be pushed forward vigorously in the main working at the 1000-foot level which has already reached a point well over the line of the Silver Cliff property which is under lease to the National Mines. Nothing in the nature of substantial deposits of commercial ore have been encountered so far; but geological conditions are considered very favorable. A large amount of tailings are being taken from the lake and placed near the mill for treatment during the winter months. Some of these tailings accumulated from ore treated in the National mill by the old City of Cobalt mining company.

### Record Shipments.

Ore shipments from the Cobalt camp for the week ending Aug. 14th, proved a record for recent years, and is concrete evidence of the speeding up of mining operations owing to the increased price being paid for silver. When it is considered that milling facilities are such that greater tonnages are being treated in almost every mill in the camp the significance of the shipping of 21 cars containing 1,504,513 pounds of ore becomes at once apparent.

### Murray-Mogridge.

The shaft at the Murray-Mogridge mine at Wolfe Lake has reached a depth of 200-feet and a working station is being cut at this point, with the completion of which lateral work will be commenced. Conditions in general at this property are considered to be very satisfactory and have led to considerable activity in the immediate district on a number of other more or less promising prospects.

### Kirkland Lake.

Where the downward continuation of the main vein of the Kirkland Lake Gold Mine was encountered at the 700-ft. level, the ore is said to compare very favorably with that found on the other levels of the property. Official advice regarding the width and value of the ore body at this depth has not been given out; but, due to the fact that gold is plainly visible in the ore, it is considered that all is quite satisfactory at this the deepest working in the Kirkland Lake camp.

### Plant for Buff-Munro.

Arrangements for the installation of a small mining plant are being made at the Buff-Munro property in Munro Township. The shaft at this property has reached a depth of forty feet and the results so far obtained are understood to be very encouraging.

### New Gold Discoveries Northeast of Matheson.

A new gold find has recently been made in the township of Coulson which adjoins the township of Rickard on the southeast corner and the township of Munro on the north-west corner. About twenty-five claims have been recorded. The mineralized zone is said to be fifty feet or more in width and is cut by small quartz stringers in which free gold and tellurides occur. A number of these claims are now under option to Mr. Edward A. Clark, of Boston, Mass., whose engineer, Mr. L. Stewart of New York, spent several days on the claims recently. Arrangements are being made to erect camp buildings

and proceed with development work as soon as possible. The scene of the new find is about ten miles northeast of Matheson and is easily accessible from the latter place.

### Coniagas.

The Coniagas mining company of Cobalt has exercised the option on the Maidens-McDonald claims adjoining the Ankerite, which they had also recently acquired in the Porcupine district. It is said the full purchase price has been paid. This gives the Coniagas a large acreage in what will probably prove productive territory. The installation of a powerful mining plant on the Ankerite is nearing completion and it is understood the initial plan of operations will include the sinking of a shaft to a depth of five hundred feet from which point it is altogether probable that both properties will be worked. The Maidens-McDonald was under option to the LaRose mining company of Cobalt for some time; but the option was allowed to expire early this summer.

### Boston Creek.

Operations at the Boston Creek mine and the R. A. P. Syndicate property at Boston Creek have been suspended pending the results of litigation over the use of the shaft of the R. A. P. by the Boston Creek mine to develop their property at depth. These two properties are the most extensively developed in the Boston Creek area at the present time and both are understood to have considerable merit, and with the present difficulties out of the way there will probably be a renewal of activity in this section. A number of other properties are receiving attention in this district and results reported to date are highly satisfactory.

### Will Work Orr Mine.

The Orr gold mine at Kirkland Lake which has been lying idle for over two years, was recently taken over by a new holding company known as the Kirkland Porphyry, and active operations are under way to develop same. In the early days of the Kirkland Lake camp this property was considered one of the most promising in the district, and quite a number of tons of high grade ore was bagged. On the west side of the Orr, 100-ft. from the boundary, the Kirkland Lake shaft is down 700-ft. This same vein is on the Orr property. On the north the Teek-Hughes is developing to the 600-ft. and meeting with excellent results, and the main vein of this mine crossed the north west corner of the Orr for a distance of about 300-ft. on the surface. In addition to this it is thought likely the Kirkland Porphyry will pick up the continuation of the Lake Shore No. 1 or main vein. Thus it would appear that the Kirkland Porphyry is beginning operations with more than ordinary reasons to anticipate success.

### May Enlarge McIntyre Mill.

Ore reserves at the McIntyre mine at Porcupine are gradually increasing in spite of the fact that the mill has been working to capacity for the past ten months and many adverse conditions have been contended with. It is generally considered likely that the McIntyre management will soon ask the directors for the addition of another four hundred tons to the capacity of the mill, which will bring the capacity up to approximately 1,000 tons per day. The average grade of ore through out the mine is \$12.50 per ton; but owing to the fact that all ore over \$2 per ton, which comes from development work is being treated, the mill heads for the next few months are expected to run around \$10 per month as no effort is being made to regulate the mill heads. A decision to increase the milling capacity to 1,000 tons per day should increase the net earnings corresponding.



ly. At the present rate the profits at this mine are estimated to be over \$1,000,000 or about thirty per cent. on the issued capital of 3,600,000 shares.

#### **Gowganda.**

A more or less extensive movement towards operating properties in the Gowganda mining camp seems to be in evidence this past few days and a considerable awakening of interest seems highly probable. In this camp silver deposits have proven more or less pockety but there are a number of properties on which veins carrying native silver on the surface are to be found. With the success attending the working of the Miller Lake-O'Brien, which is the premier mine of the Gowganda section and which is producing silver ore in sufficient quantity to class it among the best silver producers even in Cobalt, it is more than likely that capital will be forthcoming for the opening up of a number of the more likely prospects in this district.

#### **Ontario Kirkland to Operate Hurd Property.**

A deal for the purchase of the Hurd property at Kirkland Lake was consummated on the 18th of the present month, and the formation of a new company to be known as the Ontario Kirkland Gold Mines with a capitalization of 1,500,000 shares of a par value of one dollar per share, is now in the process of formation. Messrs. Harry A. Cochrane of New York city and Mr. Edward D. Seldon, of Rochester, together with their associates are the purchasers of this property. An up-to-date mining plant is to be installed and the initial plan of development consists of sinking a shaft to a depth of 300-ft., where lateral work will be undertaken.

A considerable amount of money has been spent on these claims and five veins carrying good gold values have been uncovered on the surface. On one of these veins, a shaft has been sunk to a depth of one hundred feet and the results obtained were considered highly satisfactory. The Hurd consists of two claims of forty acres each, and lies about a quarter of a mile south of the Wright-Hargraves.

#### **May Take Over Alexandra.**

It is reported here that the old Alexandra property, situated in Lot 5, concession 4, of the township of Coleman, will be taken over by one of the largest mining companies in the Cobalt camp, which company is said to be negotiating for the purchase of the property.

#### **Bailey.**

Rumors are current in the Cobalt camp to the effect that the prolonged legal entanglements in the Bailey Cobalt property are about to be satisfactorily settled, and that there is a possibility of the property being reopened in the not far distant future.

#### **Machinery Arriving for Kirkland Porphyry.**

The motors and part of the other equipment for an electrically driven mining plant for the Kirkland Porphyry property are arriving and operations at the mine are proving exceptionally satisfactory. Sinking is being carried on at the present time and a hoist and whim are being used for hoisting purposes. The shaft is being driven down at the rate of about two and a half feet per day. The orebody has well defined walls and nearly every bucket of ore raised shows visible gold. The property was formerly known as the Orr.

### **BRITISH COLUMBIA.**

For the first time in six months, during the week ended September 7 ore receipts at the Consolidated Mining and Smelting Co's smelting works at Trail, West Kootenay, exceeded ten thousand tons in a seven-day week. The custom at this smeltery is to divide

the month into four periods, three of seven days each ending on the seventh, fourteenth, and twenty-first, respectively, of the month, while the remaining nine or ten days of the month constitute the fourth week. With receipts of 10,864 tons of ore during the first week of September, the total for the expired portion of the calendar year was brought up to 249,235 tons. While this return to a comparatively large quantity of ore received weekly (the total for the ten-day period ended August 31 having been 14,082 tons) is gratifying, it is not satisfactory to note that in comparison with that of the corresponding period of 1916, this year's aggregate receipts do not show to advantage; on the contrary there has been a decrease of 84,113 tons. However, now that the smelting of copper-bearing ores has been resumed at Trail, as a result of the supply of coke having again become sufficiently large to admit of copper blast furnaces being again operated, it may be expected that ore receipts will be larger during the remainder of this year than they were during the last four months of 1916.

#### **East Kootenay.**

A review of the mineral production of East Kootenay during the eight expired months of the year—to the end of August—shows that while the output of coal has been considerably less, that of ore has been much greater. The coal figures for August of this year are not yet available, but for seven months ended July 31 the gross production of coal (that is, including the coal made into coke) from Crowsnest mines was approximately 301,000 long tons, or about 43,000 tons a calendar month, which compares with a monthly average production of 73,522 tons for the whole of 1916. Of course, the suspension of coal-mining during the several months of this year the miners were on strike is the cause of this decrease, which, happily, is not being continued, except perhaps in very much smaller degree, now that the coal-miners are again working steadily.

The position in connection with metalliferous mineral production, though, is very different, for the total quantity of ore from East Kootenay mines received at the Consolidated Mining and Smelting Co's smeltery at Trail, whence is sent practically all ore shipped from the metal mines of the district, during eight months of 1917, to the end of August, was 94,081 tons, or an average of 11,760 tons a month, against 99,531 tons, or an average of 8,294 tons a month, for the whole of 1916. Given a continuance of production at a similar rate throughout the remainder of this year, there will be an increase in 1917, as compared with 1916, of more than 40,000 tons, or rather better than 40 per cent. The present outlook is that it will be even greater than this, but it is unsafe to base a confident forecast on such uncertain conditions as attend the operation of mines these days, so it will be best to await the close of the year for a sure record of progress, rather than now take it for granted that advancement will be made to the extent suggested above as possible. It should be stated that by far the greater part of the ore produced in East Kootenay district comes from the Consolidated Mining and Smelting Co's, Sullivan lead-zinc mine, the output of which during the eight expired months of this year has been 90,830 tons as compared with 97,658 tons during the whole of 1916. The same company's St. Eugene mine has shipped to Trail in eight months of this year 1198 tons of ore against 979 tons during the whole of 1916. The only other mine in the district that has shipped



more than one thousand tons of ore this year is the Paradise, in Windermere mining division, which has made an output of 1501 tons in eight months as compared with 428 tons in 1916.

The smeltery ore receipt returns show that in addition to the mines above mentioned, eight small mines have shipped ore this year, namely, the Burton and Quantrell, in Fort Steele division; the Couverapee and Monarch, in Golden division, and the Copper Butte, Isaac, Lead Queen, and Silver Belt, in Windermere division.

It is reported that the Consolidated Co. will shortly commence the erection in the district and equipment of a concentrator for the concentration of ore from its Sullivan mine. If such a plant be provided and regularly operated, it is to be expected that next year's increase in production from that mine will be even larger than that of 1917 over the output of 1916.

#### West Kootenay.

Ainsworth.—The New Canadian Metal Co., operating the Bluebell lead mine near the east shore of Kootenay lake is stated to be opening that mine at greater depth. The Nelson Daily News recently printed the following concerning the Bluebell: "Sinking to an additional vertical depth of 75 ft. below the level of Kootenay lake is being carried out at the Bluebell mine at Riondel. The additional depth of the shaft on the slope will be 100 ft., about one-half of which is completed. When the work shall have been finished, a total vertical depth of 375 ft. below the level of the lake will have been attained. At the greater depth one of the peculiar features of the ore is that a larger percentage of oxidized ore is being found. This ore does not concentrate well, being so light that it floats off the tables in a sort of white slime. Hence, Mr. S. S. Fowler, general manager for the company, is shipping as much of it to the smeltery in crude form, without concentration, as he can secure barges to ship it on. High metal prices and the desirable nature of the ore from a smelting viewpoint make it just practicable to mine and ship it in crude form. The geological explanation of the presence at depth of the oxidized ore is that Kootenay lake was originally a river, and the ore which is now being mined 300 ft. or so below the lake level was then near the surface."

Slocan.—During thirty-eight days ended September 7 a dozen mines in Slocan mining division together shipped to Trail 3465 tons of ore and concentrate, chiefly silver-lead. Those situated in the neighborhood of Silverton, Slocan lake, were the Galena Farm, Hewitt, Lucky Thought, Standard and Van-Roi, with a total of 1590 tons, nearly half of which was from the Standard. From Alamo, the Idaho-Alamo shipped 76 tons and the Queen Bess 513 tons. From Sandon the shipments totalled 911 tons, of which 365 tons was from the Surprise and 317 tons from the Slocan Star; the remainder came from the Freddy Lee (which about 25 years ago made the first bulk shipment of ore ever sent out from a Slocan mine), Gray Copper, Lone Bachelor, Reco, Sovereign and Wonderful. From the eastern part of the division shippers were Lucky Jim 238 tons and Rambler-Cariboo 137 tons.

A recent report from Spokane, Washington, is to the effect that Mr. B. Crilly, who has been actively associated with mining in West Kootenay for fifteen years or longer, in the early nineties with Lardenn mines and latterly successfully mining in Nelson division, has secured under lease and bond the Fisher Maiden group, situated about seven miles up Four-mile creek from

Silverton. As long ago as 1894 some 50 tons of ore was shipped from this property, which is credited with a total later output of about 1000 tons of ore, having a low lead content and from 90 ounces upward of silver to the ton. Official records mention a production of fifteen cars of ore in 1903 and five cars in 1904. The mine has been worked intermittently, but of late years little ore has been shipped from it, although it is stated there is a comparatively large quantity available for mining.

#### BOSTON CREEK.

Discussing the dispute which has resulted in the delay of development of gold properties at Boston Creek, the "Toronto Star" quotes Mr. J. Papassimakas as follows:

"Mr. Eugene M. Richardson of New York is the president, Mr. Wm. B. Albright of New York is the vice-president, and Mr. H. D. Symmes of Niagara Falls, Ont., is the managing director of Boston Creek Mines, Limited. In May last, being a substantial shareholder, and a director of the Boston Creek Mines, Limited, I became dissatisfied with the conduct of the property under the officers entrusted with it, and also with the newspaper campaign which was being carried on, without objection by these officials, for the purpose of selling stock, and took steps to force the officials to remedy so far as possible the various matters connected with the administration of the affairs of the company, which I believed were mismanaged. For this purpose on May 9th last I sent a registered letter to the officials urging the holding of the annual meeting of the shareholders, the issuing of an annual report, and a statement of the result of operations on the property, with the idea of thereby securing for the shareholders either official confirmation or denial of the claims being made in the stock selling campaign. However, no meeting has been held, and no report of mine conditions or finances has been given to the shareholders."

The chief claim of the Boston Creek Mines comprises about forty acres, adjoining which are other mining properties owned by the R. A. P. Prospecting, Developing, and Mining Company in part, and by Mr. Papassimakas personally in part. The property immediately adjoining that of the Boston Creek Mines, Limited, was known as mining claim 5,163, and by consent of the R. A. P. syndicate, of which Mr. Papassimakas is a member, the shaft on this property was turned over for a time for the use of the Boston Creek Company, in order to give them access to their own property at depth, and to raise a shaft on the Boston Creek claims.

#### SILVER PRICES.

	New York. cents.	London pence.
September—		
6 .....	95½	48½
7 .....	96½	49
8 .....	96½	49
10 .....	97½	49½
11 .....	98½	50
12 .....	98½	50
13 .....	98½	50
14 .....	100½	51
15 .....	100½	51
17 .....	102½	52
18 .....	103½	52½
19 .....	105½	53½
20 .....	106½	54
21 .....	108½	55



## PRODUCTION OF IRON AND STEEL IN CANADA 1917.

(January to June).

The Mines Branch of the Department of Mines, Ottawa, has received from the producers complete returns of the production of pig iron in Canada and with the exception of two small plants complete returns of the production of steel ingots and castings during the first six months of 1917.

The total production of pig iron during the first six months was 586,998 short tons, as against 562,097 tons during the first six months of 1916. The average monthly production in 1917 was 97,833 tons, as against an average monthly production throughout 1916 of 97,438 tons.

Furnaces were in blast at Sydney and North Sydney, N. S., Hamilton, Port Colborne, Sault Ste. Marie, and Deseronto, Ont. The Deseronto furnace went into blast in May, having been out during the first four months. Small quantities of pig iron were also produced in electric furnaces from scrap steel at Orillia, Ont. and Montreal, Que.

The total production of steel ingots and direct castings during the first six months was 836,149 short tons, as against 589,553 tons during the first six months of 1916. The average monthly production during the first six months of 1917 was 139,358 tons as against an average monthly production throughout 1916 of 106,268 tons.

The production of steel, in electric furnaces included above were 18,797 tons during the first six months of 1917 as against a total of 19,639 tons produced throughout 1916.

## TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.

Cobalt oxide, grey, \$1.65 per lb.

Cobalt metal, \$2.25 per lb.

Nickel metal, 45 to 50 cents per lb.

White arsenic, 15 cents per lb.

Sept 24, 1917—(Quotations from Canada Metal Co., Toronto)

Spelter, 11 cents per lb.

Lead, 12 cents per lb.

Tin, 63 cents per lb.

Antimony, 18 cents per lb.

Copper, casting, 32 cents per lb.

Electrolytic, 33 cents per lb.

Ingot brass, yellow, 20 cents; red, 25½ cents per lb.

Sept. 24, 1917—(Quotations from Elias Rogers Co., Toronto)

Coal, anthracite, \$9.50 per ton.

Coal, bituminous, nominal, \$9.00 per ton.

In Nicola Valley district the coal mines are stated to now be doing better, with an improved market for their coal. Renewed attention to metal mining in Nicola division is also promised.

**FOR SALE**

**\$300,000.00 Worth of Released Machinery**  
Consisting of

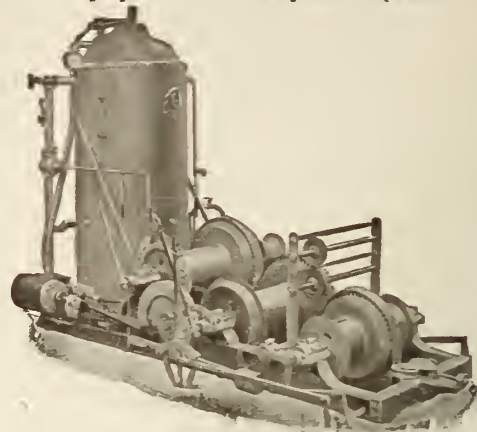
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The above constitutes a few only of the various articles for sale.

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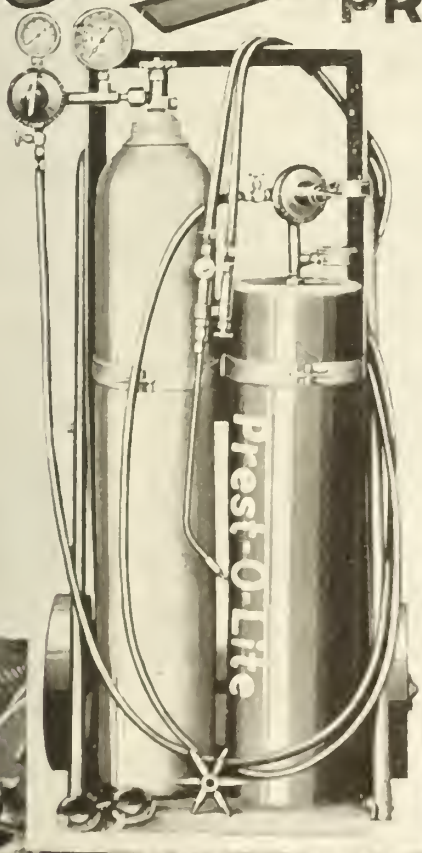
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- The Petroleum and Natural Gas Resources of Canada: Vols. I. and II., by F. G. Clapp, M.A., and others.
- The Value of Peat Fuel for the Generation of Steam. Bulletin No. 17, by John Blizard, B.Sc.
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- Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.
- Map 166A. Portion of Flathead Coal Area, Kootenay District, B.C. Topography.
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- Map 186A. Explored Routes between Lake Athabaska and Great Slave Lake on the Tazin, Taltson, Slave and Peace Rivers.
- Map 1667. Slocan Mining Area, Kootenay District, B.C.
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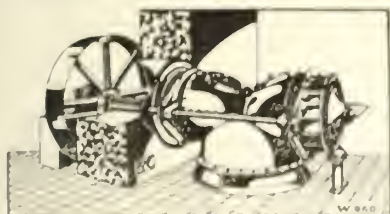
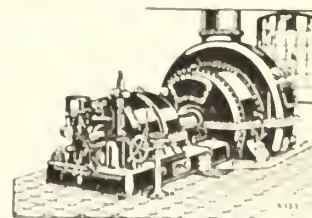
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**Hangers—Cable—**  
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**High Speed Steel Twist Drills—**  
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<b>Pipe Fittings—</b> Can. Fairbanks-Morse Co. Northern Canada Supply Co.	<b>Pumps—Pneumatic—</b> Can. Fairbanks-Morse Co. Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd. Sullivan Machinery Co.	<b>Samplers—</b> C. L. Constant Co. Ledoux & Co. Milton Hersey Co. Thos. Heys & Son.	<b>Steel—Tool—</b> N. S. Steel & Coal Co. Armstrong, Whitworth of Can., Ltd.
<b>Piston Rock Drills—</b> Mussens, Limited.	<b>Pumps—Steam—</b> Can. Fairbanks-Morse Co. Can. Ingersoll-Rand Co., Ltd. Mussens, Limited. Northern Canada Supply Co. Jenckes Machine Co.	<b>Scales—</b> Can. Fairbanks-Morse Co.	<b>Surveying Instruments—</b> W. F. Stanley. C. L. Berger.
<b>Pneumatic Tools—</b> Can. Ingersoll-Rand Co., Ltd. Jones & Glassco. Jenckes Machine Co.	<b>Pumps—Turbine—</b> Can. Fairbanks-Morse Co. Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd. ada, Limited.	<b>Screeners—</b> Jeffrey Mfg. Co. Northern Canada Supply Co. Hendrick Mfg. Co.	<b>Tanks—Cyanide, Etc.—</b> Hendrick Mfg. Co. Pacific Coast Pipe Co., Ltd. MacKinnon, Holmes & Co.
<b>Prospecting Mills and Machinery—</b> Standard Diamond Drill Co.	<b>Pumps—Vacuum—</b> Can. Fairbanks-Morse Co. Smart-Turner Machine Co.	<b>Screeners—Cross Patent Flanged Lip—</b> Hendrick Mfg. Co.	<b>Transits—</b> C. L. Berger & Sons.
<b>Pulleys, Shafting and Hangings—</b> Can. Fairbanks-Morse Co. Jeffrey Mfg. Co. Northern Canada Supply Co.	<b>Quarrying Machinery—</b> Sullivan Machinery Co. Can. Ingersoll-Rand Co., Ltd. Jenckes Machine Co.	<b>Separators—</b> Can. Fairbanks-Morse Co. Smart-Turner Machine Co.	<b>Turbines—</b> Escher Wyss & Co.
<b>Pumps—Boiler Feed—</b> Can. Fairbanks-Morse Co. Smart-Turner Machine Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd. Wettlaufer Bros.	<b>Roofing—</b> Can. Fairbanks-Morse Co. Northern Canada Supply Co.	<b>Sheet Lead—</b> Canada Metal Co., Ltd.	<b>Twist Drills—High Speed—</b> Can. B. K. Morton Co.
<b>Pumps—Centrifugal—</b> Can. Fairbanks-Morse Co. Escher Wyss & Co. Mussens, Limited. Smart-Turner Machine Co. M. Beatty & Sons. Can. Ingersoll-Rand Co., Ltd.	<b>Rope—Manilla and Jute—</b> Jones & Glassco. Northern Canada Supply Co. Allan, Whyte & Co.	<b>Sheets—Genuine Manganese Bronze—</b> Hendrick Mfg. Co.	<b>Valves—</b> Can. Fairbanks-Morse Co.
	<b>Rope—Wire—</b> Allan, Whyte & Co. Northern Canada Supply Co. Can. B. K. Morton	<b>Shovels—Steam—</b> M. Beatty & Sons.	<b>Winding Engines—Steam &amp; Electric—</b> Can. Ingersoll-Rand Co., Ltd. Jenckes Machine Co.
		<b>Stacks—Smoke Stacks—</b> Can. Fairbanks-Morse Co. Hendrick Mfg. Co. MacKinnon, Holmes & Co.	<b>Wire Cloth—</b> Northern Canada Supply Co. B. Greening Wire Co., Ltd.
		<b>Steel Barrels—</b> Smart-Turner Machine Co.	<b>Wire (Bare and Insulated)—</b> Standard Underground Cable Co. of Canada, Ltd.
		<b>Steel Drills—</b> Sullivan Machinery Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd. Can. B. K. Morton.	<b>Zinc Spelter—</b> Canada Metal Co., Ltd. Hoyt Metal Co.

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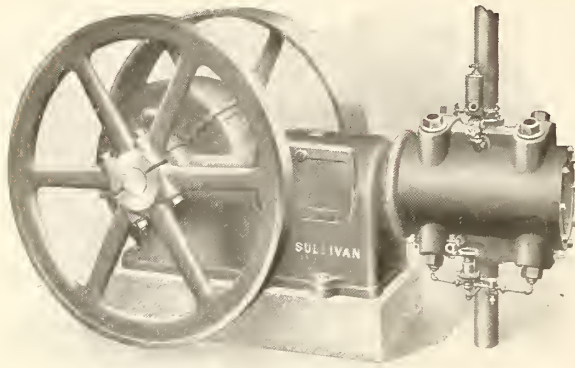
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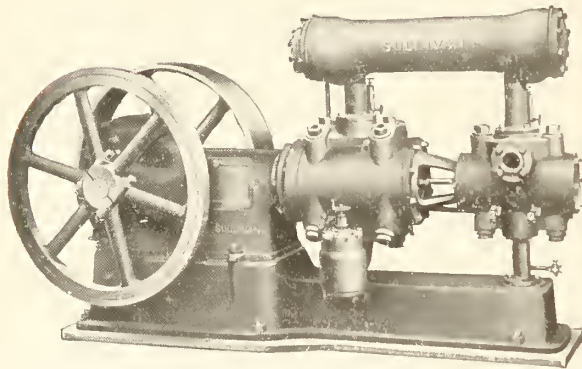
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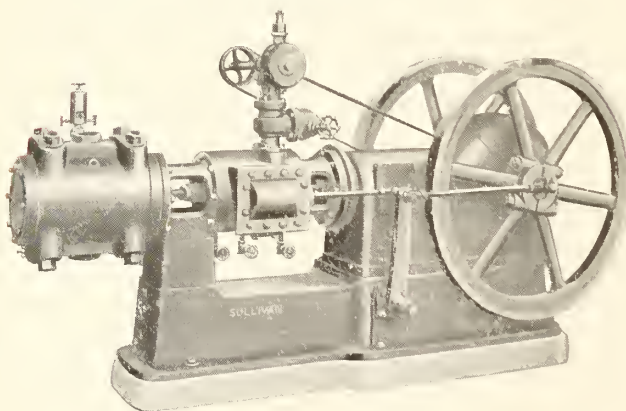
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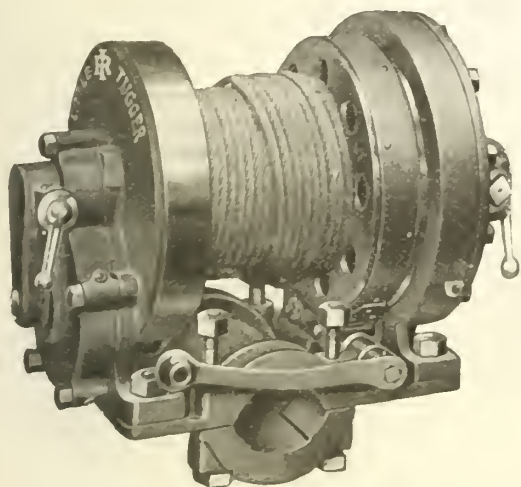
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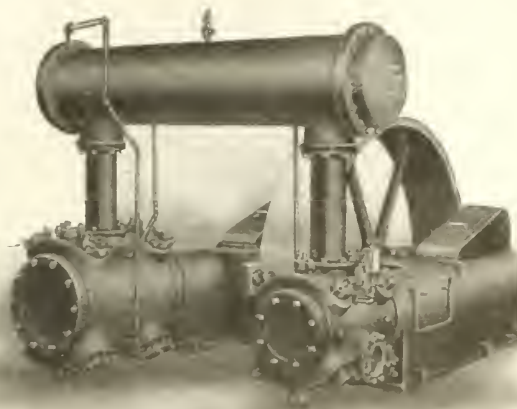
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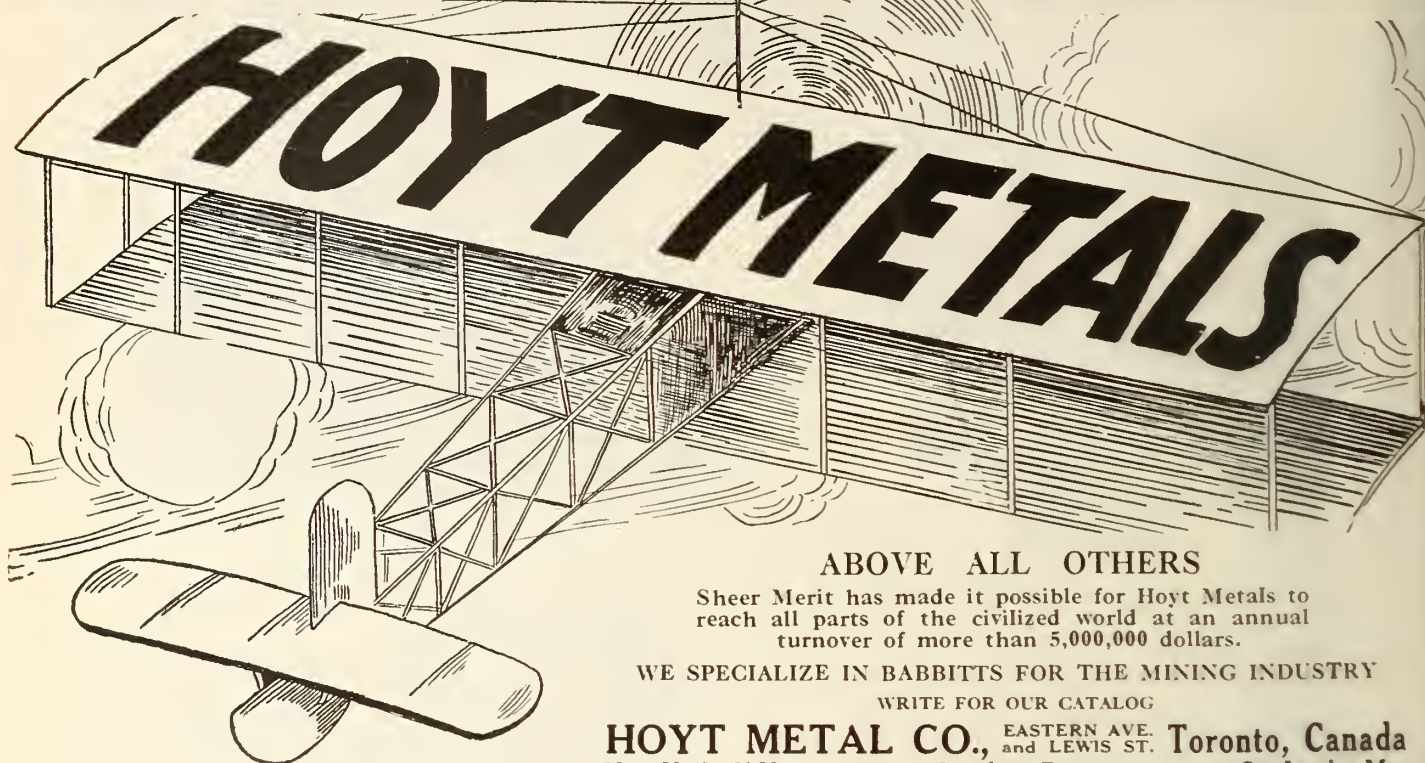
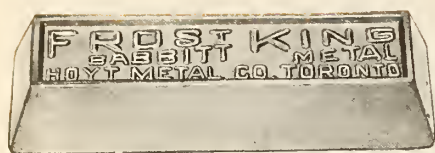
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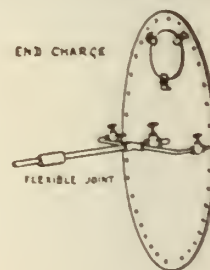
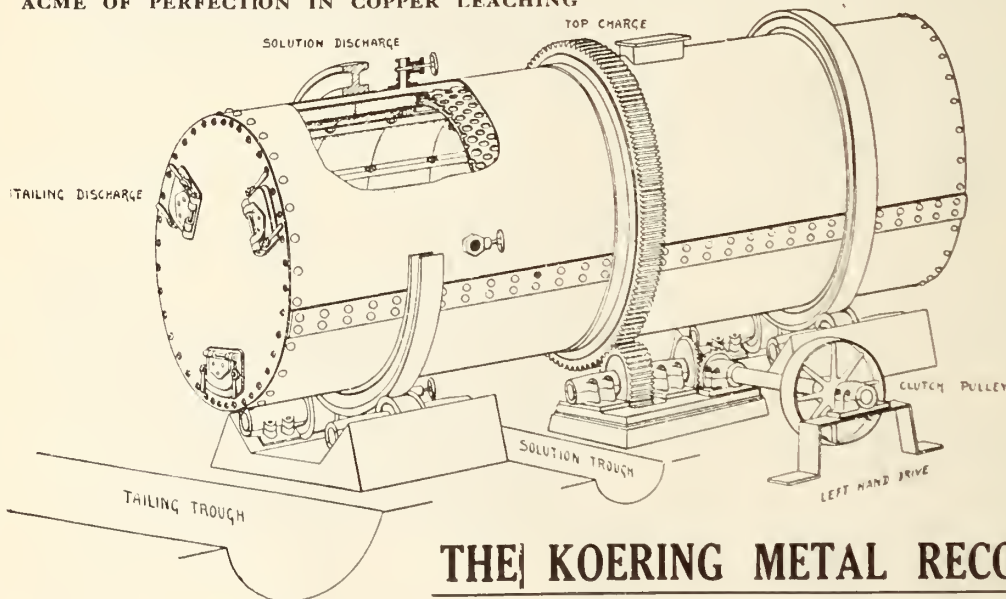
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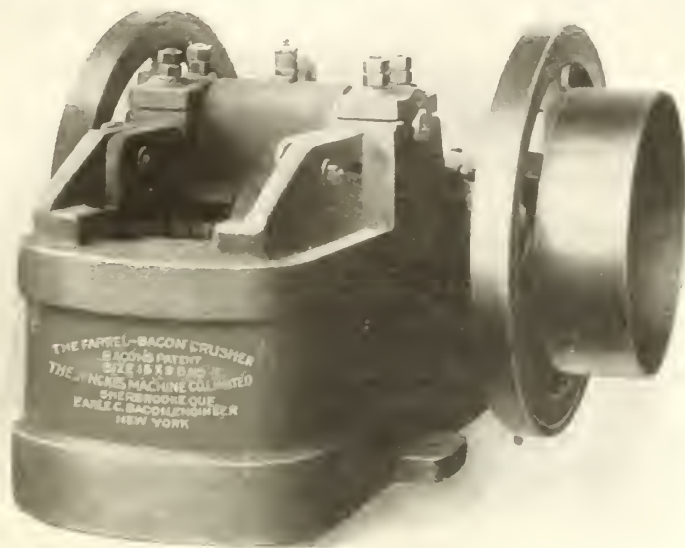
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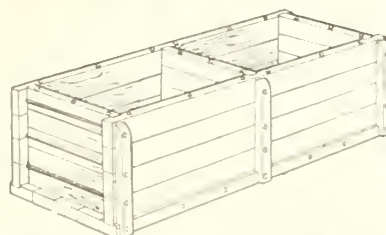
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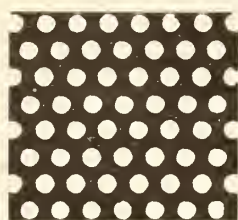
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**Iron** The province contains numerous districts in which occur various varieties of iron ore, practically at tide water and in touch with vast bodies of fluxes. Deposits of particularly high grade manganese ore occur at a number of different locations.

**Gold** Marked development has taken place in this industry the past several years. The gold fields of the province cover an area approximately 3,500 square miles. The gold is free milling and is from 870 to 970 fine.

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Prospecting and Mining Rights are granted direct from the Crown on very favorable terms.

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**MINERS' CERTIFICATES.** First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

**WORKING CONDITIONS.** During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

**SIX MONTHS AFTER STAKING.** At the expiration of six months from date of the staking, the prospector, to retain his rights, must take out a mining license.

**MINING LICENSE.** The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

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The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

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# The Flotation Process

All patent and other rights to this process  
in North America are now controlled by

## Minerals Separation North American Corporation

who is the registered owner of the following Canadian patents: Nos. 76,621; 87,700; 94,332; 94,516; 94,718; 96,182; 96,183; 99,743; 127,397; 129,819; 129,820; 134,271; 135,089; 137,404; 142,607; 147,431; 147,432; 148,275; 151,479; 151,480; 151,619; 151,810; 157,488; 157,603; 157,604; 160,692; 160,693; 160,694; 160,846; 160,847; 160,848; 160,849; 160,850; 160,937; 163,587; 163,608; 163,707; 163,936; 165,390; 166,415; 167,474; 167,475; 167,476; 167,603.

On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

### NOTICE

Notice is hereby given that we will enforce our patents and stop all infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

Notice is further given that no one is authorized to introduce our processes or apparatus into the United States, Canada or Mexico.

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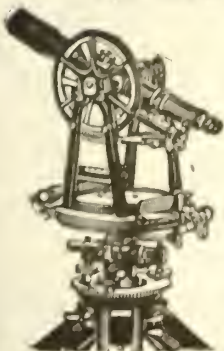
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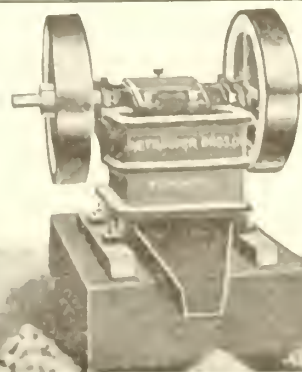


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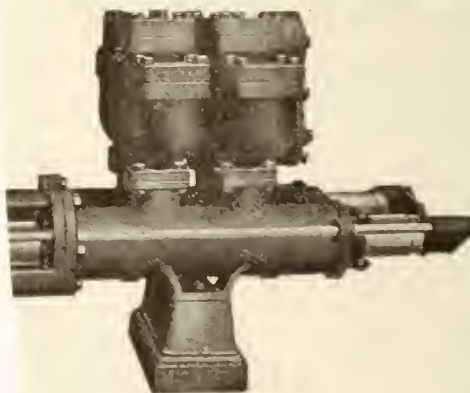
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# THE CANADIAN MINING JOURNAL

VOL. XXXVIII.

TORONTO, October 15th, 1917.

No. 20

## The Canadian Mining Journal

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### OPENING GRAPHITE DEPOSIT.

Mr. J. C. Beidelman of Montreal is opening up a graphite deposit in Lyndoch township, Renfrew Co. Ont.

### SHIPPING CHROMITE FROM A NEW MINE IN QUEBEC.

Several car loads of high grade chromite ore have been shipped from a deposit opened last winter near Richmond, Quebec.

### THE MINERALS SEPARATION CORPORATIONS AND THE FLOTATION PROCESS.

During the past two weeks there have appeared in Cobalt and Toronto newspapers a number of articles calculated to arouse public opinion against the Minerals Separation North American Corporation. The refrain of all these articles is that the corporation is a German concern or controlled by Germans, and that its patents in Canada should therefore be cancelled.

It is possible that the authors of these articles believe that the corporation is controlled by Germans, for it is well known that one of the agents of the British corporation, which conducted the business at the time the war began, was the American branch of a German firm. If they do not believe it, they are using methods that are highly discreditable and if the charges cannot be proven, the episode will not reflect any honor on the mining fraternity.

We are not convinced that the charges have, at this date, been amply substantiated by the evidence offered. It is true that the association of the British corporation with Beer, Sondheimer & Co., is enough to arouse suspicion, and it is only reasonable to demand an investigation of the connection between these two firms and the American corporation. We are not overly enthusiastic about the possibility of proving the American corporation to be German and thus so easily disposing in Canada of the flotation patents. The chance of doing this is enough incentive to warrant a great effort; but it would be foolish to assume that the charge can be readily proven. Our own opinion at present is that the charge is false.

The charges made by the "Toronto World" are of such a character that we are doubtful as to their sincerity. Surely no one who had sufficiently investigated the case would state that the flotation process is a German process.

The charges made by the "Northern Miner" have been apparently more carefully considered than those of the "Toronto World" and are more worthy of consideration. We cannot avoid feeling, however, that the investigation made before launching the campaign has not been as complete as it might easily have been and that there seems to be a greater desire to arouse the public than to enlighten it.

Those who are interested in the application of the flotation process to the treatment of Canadian ores, have had plenty of opportunity of familiarizing themselves with the litigation that has accompanied the use of this process in other countries, particularly in the United States. During the past few years flotation and flotation litigation has been a never ending topic of discussion among mining men. Our excellent con-



temporary, the "Mining and Scientific Press," edited by Mr. T. A. Rickard, has published a great quantity of information about the process. Other technical journals have also devoted much space to flotation. At meetings of mining societies, in recent years, the subject has been much discussed. Practically every mine manager has given careful consideration to the possibility of treating some of the products of his mine by flotation and those in charge of concentrating plants in all parts of the country have been using or experimenting with the process. Flotation has been successfully used for several years and there is an abundant literature concerning the process and the litigation that has accompanied its use. Our readers are well aware that the successful application of the process is due to British and American metallurgists. They will therefore be somewhat amazed to read in the "World" that "for this process the world is indebted to Germany." The "World" could not have expected to fool mining men by this statement. We naturally conclude that the misinformation is for public consumption.

It is unfortunate for the Canadian mining industry that the flotation process is patented and it is particularly unfortunate that the Minerals Separation corporations have a reputation for "hoggishness." The validity of the patents has been questioned in the United States, but there is no use blinding oneself to the fact that recent decisions in the United States are in favor of the Minerals Separation corporations. On the other hand, there is every reason to believe that the Minerals Separation corporations have been unreasonable in their demands, particularly as to contracts in reference to discoveries made by the users of the process.

In our opinion the Minerals Separation corporations deserve much of the criticism that they receive. We hope that the American corporation will fail to get favorable decisions in Canadian courts if it attempts to prove infringements here. In the United States, Minerals Separation corporations have proven too selfish and arbitrary for the good of the industry and they do not deserve the good wishes that they would be otherwise entitled to.

We hope that the decisions in Canadian courts, if the claims are pressed, will be so favorable to Canadian operators that even Mr. T. A. Rickard may be able to commend them. But we hope also that the public will be properly informed as to the facts and that the newspapers will not continue to mislead their readers. The object striven for commends itself to us. We are not satisfied with the means.

We do not think that many of our readers will wish us to accuse the men who control the Minerals Separation North American Corporation of being Germans or German agents. It would undoubtedly simplify matters if they were. We have, however, no good reason to suppose that they are. They have been in bad company and they will suffer for it. They have been

greedy and this will not be forgotten. We do not believe, however, that the American corporation is German or that it wishes to retard production.

The character of the campaign being carried on by the "Northern Miner" is indicated by an editorial published in the "Northern Miner" of October 6th, 1917. Our readers will understand the editorial better when they are informed that the telegram sent to the "Northern Miner" has been carelessly copied by that paper. Our copy reads as follows: "Former agents of M. S. Co., German. Corporation itself British. No evidence to contrary."

For those who may be unfamiliar with the organizations referred to, we may state here that Minerals Separation, Ltd., was registered as a British corporation in England in 1903. In 1913 the Minerals Separation American Syndicate, Ltd., was registered in England to acquire the rights of the Minerals Separation, Ltd., in North America. This British corporation's agents in New York when the war began were Dr. S. Gregory and the American branch of the German firm of Beer, Sondheimer & Co.

It was, of course, to the latter firm and not to Dr. Gregory, that we referred to in our telegram.

The "Northern Miner" seems to be of the opinion that the American corporation, formed in December, 1916, is represented by Beer, Sondheimer & Co. Such a belief might explain the distortion of our message. We think that the "Northern Miner" is mistaken in its belief; but we are willing to assume that it has such. The space which is devoted by the "Northern Miner" to prove that Beer, Sondheimer & Co. is a German corporation indicates that it really believes that that is the important point. For our part we have never had any reason to doubt that these former agents of the British corporation are German.

The "Northern Miner" editorial of October 6th, in part, follows:

"When The Toronto World published its first article regarding flotation an error appeared to the effect that Minerals Separation North American Corporation was stated to be the agents of Beer, Sondheimer & Co. This, of course, was putting the cart before the horse. Mr. R. E. Hore, editor of the Canadian Mining Journal, here appeared on the scene. A bold defender of Minerals Separation, he tried desperately to lobby in the interests of this company, but his success thus far has been unnoticed.

"On hearing that Mr. Hore was busying himself in this matter, The Northern Miner wired him as follows:

"If you are sure M. S. Co. is a British concern wire your proof to Northern Miner. Many mine managers in Cobalt think otherwise."

"On the following day we received this reply:

"Former agents of M. S. Co., German corporation, itself British, no evidence to contrary."

"In view of the facts this reply proves that Mr. Hore did not know what he was talking about. In the first instance, Beer, Sonheimer and Company are not former agents, but are the agents to-day. And in the



second instance, Minerals Separation North American Corporation is not a British company, but was incorporated under the laws of the State of Maryland.

"Mr. Hore also went out of his way to discredit the disclosures and befuddle the public by stating the following in the last issue of the Canadian Mining Journal:

"The Toronto 'World' claims that the Minerals Separation Company is controlled by Germans and that the flotation process originated in Germany. The company's methods are such that they have aroused much opposition and criticism is to be expected, but the 'World' is not well informed as to the facts."

"Naturally, we would have expected that an editor of a mining paper would have adopted different tactics. There is absolutely no doubting the facts regarding Beer, Sondheimer and Co. Even if Mr. Hore had been correct in his assertion that the M. S. Co. was a British Corporation it is quite safe to say that their methods are not in the interests of the Allies in this war. But unfortunately for the M. S. Co. apologist, he is the party that is misinformed, and not The Toronto World and The Northern Miner."

To this we say that our telegram gives the facts correctly. It has been misinterpreted by the "Northern Miner," whether purposely or not we do not know.

In December, 1916, an American corporation, known as the Minerals Separation North American Corporation, was formed in Maryland. This Corporation, so far as we know, has never been represented by Beer, Sondheimer & Co. It is an American corporation controlled by three men, two of whom are British and the third an American.

The "Northern Miner" evidently wishes its readers to believe that our objection to the statements of the "Toronto World" is an indication of friendliness for the corporation which wishes to collect royalties from Canadian mining companies. The "Northern Miner" may have some readers that will believe that we "tried desperately to lobby in the interests of this company." As a matter of fact we objected to the statements made by the "World" because we believe them to be incorrect. Our enquiries satisfied us that the newspapers were being used for purposes that are not creditable to the mining industry and we warned the "World" to be more careful in its statements. We may have interfered with plans that have a worthy object; but we have simply urged that there be no misrepresentation of the facts.

Low grade ores have been, and are being, treated profitably at Cobalt by several processes. The flotation process has proven in some cases more profitable than other processes. It is this increase in profit that represents the advantage gained by use of flotation machines, and it is only on this increase that the owners of patents can reasonably claim a royalty, if infringement is proven. They cannot justifiably lay claim to all this increase; but only to a reasonable percentage. There will doubtless be much difference of opin-

ion as to what is a "reasonable" percentage; but there is no room for the opinion that such excessive royalties can be charged that the use of the process would not be warranted.

If it is true that the American corporation threatens Canadian users of the process with claims for excessive amounts, the corporation must be only bluffing. Absurd claims will not be tolerated here, even if some United States courts have made themselves ridiculous. If the bluff is called we may expect that the corporation will offer reasonable terms before initiating litigation in Canada; for if the corporation is well informed it can hardly expect to be as successful in Canadian courts as in United States courts. Our laws allow only a reasonable royalty. Moreover, Canadians are not likely to allow anyone at this time to get away with threats of interference with production.

While we cannot accept the evidence offered by the "Northern Miner" as proof that the Minerals Separation corporations are controlled by Germans, we will be pleased if the agitation results in an investigation of the connection between the British corporation, Minerals Separation American Syndicate, Ltd., and Beer, Sondheimer & Co. The latter firm is unquestionably German. Why then did not the British corporation break off all relations with the American branch of this firm at the outbreak of war? What significance is to be attached to the fact that Mr. N. M. T. Sondheimer was a director of the American Syndicate?

As has been quite properly pointed out by the "Northern Miner," the successful application of the flotation process to the treatment of Cobalt silver ores reflects no credit on the Minerals Separation corporations. For the good results obtained we have to thank the mine managers and their staffs and Mr. J. M. Callow and his assistants. By co-operation between Mr. Callow and the mine managers the silver mining industry has greatly profited. It would be unjust to allow the Minerals Separation corporations to appropriate the profits resulting from the work of the Cobalt metallurgists and Mr. Callow.

One good feature of the campaign of the "Northern Miner" against the Minerals Separation corporations is the publicity it is giving to the ramifications of the German Metal Trust. The campaign will be worth while if it helps to break down German control of the metal industry. This is not the main object of the campaign; but it should prove a valuable by-product. We assume that our readers are well aware that Beer, Sondheimer & Co. is an American branch of the German Metal Trust that had a strangled hold on the metal industry. The campaign will help to spread the information.



The "Northern Miner," in its issue of October 6th, says that the following list of officers of the Minerals Separation North American Corporation was "furnished by a reliable New York source, was evidently taken from the official records, but we cannot say, as to whether these companies are officered by the same men to-day": President, Beno Elkan; vice-president, Otto Frohnknecht; secretary, Jas. A. Nelson; treasurer, Harry Falek; general manager, Dr. S. Gregory. With the exception of Dr. Gregory, these men are said to be officers of Beer, Sondheimer & Co. Our information is that the only directors of Minerals Separation North American Corporation are John Ballot, Dr. S. Gregory and Frank Altschul, none of whom are Germans. We agree with the "Northern Miner" that if its information is reliable an investigation should be demanded. Our information on this point comes from the corporation and its counsel. Mr. H. D. Williams states that Minerals Separation North American Corporation is not and never has been associated with the German Metal Trust.

The "Northern Miner" evidently wishes its readers to believe that Beer, Sondheimer & Co. are agents for the American corporation "Minerals Separation North American Corporation." The American branch of Beer, Sondheimer & Co. were agents for the British corporation "Minerals Separation American Syndicate"; but, so far as we know, are not and never were agents for the American corporation.

#### EMBARGO HURTS YUKON.

Dawson.—The order of President Wilson of August 2 placing an embargo on the exports of steel, iron, grease and oil is working a hardship on the gold mining industry of the Yukon. This camp being on the Canadian side, material of the kind for the large dredges here is held up en route, and part which are vitally essential to the operation of the dredges cannot be secured. One large express shipment of parts for the Canadian Klondyke company is held at Skagway under the order. Acting Manager J. W. Boyle, Jr., is conferring with the authorities at Ottawa through Dr. Thompson, the Yukon member of parliament, seeking to get a release of the material or waiver of the ruling, especially on this shipment, as it was ordered before the president's decree was promulgated. It is believed that the president did not have in mind the hurting of such an industry as this which contributes so largely to the gold reserves which goes to America and the financial strength of the Allies, and that when he is apprised of the facts, he will remove the disability in so far as it applies to this region.—Dawson News.

Dawson, Y. T., Sept. 18.—The last boat for Dawson from Fairbanks this year leaves Sept. 24. The last boats for Whitehorse from here are expected to leave in about three weeks. The big lower Yukon fleet, which has been handling heavy tonnage from St. Michael for the new American government railway at Henana, is expected here soon and will go into winter quarters at Dawson and Whitehorse.

#### THE CONCENTRATION OF MOLYBDENITE.

To the Editor of the Canadian Mining Journal:

Sir,—In your issue for September 15th, an anonymous correspondent attempted to discredit the work of the Mines Branch, Department of Mines, in the concentration of molybdenum ores. Such unsigned letters are usually not worth answering; but it would seem desirable that in this particular case a few facts concerning the concentration of molybdenite may prove of interest to your readers and possibly of educational value to your correspondent.

The main reasons why the Mines Branch adopted the Wood film flotation apparatus in 1916 were as follows:

1st. The problem confronting the Department was the concentration of various types of molybdenite ores and the Wood apparatus proved its adaptability in the concentration of ores containing an assortment of sulphides.

2nd. The necessary machinery was easily and quickly procurable.

3rd. The process was not difficult to control, and high grade concentrate could be obtained.

In the second paragraph of your correspondent's letter he states as follows:

"The Wood machine or indeed the water film flotation process has proved absolutely unreliable economically wherever used for molybdenite concentrating in Canada, and this process has been discontinued wherever used."

This statement is absolutely untrue as far as this Department is concerned, as up to the present time the Department has concentrated by water film flotation 3,612.9 tons of various molybdenite ores containing an average of 2.125% of molybdenite, and has actually shipped 127,193.8 pounds of molybdenite in the form of concentrates, the actual recovery of molybdenite being 82.8% of the original molybdenite contained in the ore. These figures may be substantiated by inspection of the records of the Department which contain both the weight and the assays of every car of ore treated; daily tailing assays and weights and assays representing each parcel of molybdenite shipped. Furthermore the tailings from these operations have been impounded and accurately sampled and assayed, checking the results of the concentrating laboratories.

The Wood machines were originally installed at the Quyon, Quebec, mines, by the Canadian Wool Molybdenite Company, and these machines were operated for some time by their successors, the Dominion Molybdenite Company. That neither of the above companies understood or appreciated the requirements of the Wood process is well known by anyone who is familiar with operations at Quyon.

The essential point in concentrating ores by the Wood process is that while the ore must be thoroughly dry the drying process should be conducted carefully so as to avoid oxidation of the molybdenite flakes. The slightest film of oxide caused by overheating renders the recovery of such oxidized molybdenite impossible.

Both the Wood Molybdenite Company and the Dominion Molybdenite Company carried out their drying process in such a careless manner that a heavy loss of molybdenite resulted; and although the operators were warned of the cause of this loss by officials of the Department of Mines they were apparently incapable of rectifying the trouble.

The Wood Process has been used in Canada only by the Canadian Wood Molybdenite Company, The Dominion Molybdenite Company, and the Department of Mines. The Dominion Molybdenite Company, successors to the Canadian Wood Molybdenite Company, have, it is true, discontinued the Wood Process and adopted the Callow cells. The Department of Mines, however, has still retained the Wood machine and finds it invaluable in the concentration of molybdenite ores which carry appreciable quantities of other sulphides.

It is a pleasure to learn that the Dominion Molybdenite Company are meeting with success in the operation of their Callow cells; but it should be understood that the concentration of Quyon ore, up to the present, has been one of the simplest problems by either oil froth or water film flotation. The milling problem confronting the Dominion Molybdenite Company would have been somewhat different if Quyon ore had contained a large proportion of pyrite and pyrrhotite or a small percentage of chalcopyrite.

The third paragraph of your correspondent's letter states as follows:

"The Mines Branch could not have spent much time in experimenting with the oil flotation process, or maybe they knew nothing of the application of the process, or they would never have tried the Wood machine."

During the fall of 1915 the Mines Branch installed a standard four cell Mineral Separation machine and operated the same on various Ontario molybdenite ores containing both pyrite and pyrrhotite for a period of eight weeks. These tests resulted in the production of a concentrate containing molybdenite, pyrite and pyrrhotite which required oxidation and subsequent re-concentration for preferential flotation of the molybdenite. Furthermore, this work was conducted some three or four months before the Quyon deposit was even prospected.

While conducting the experiments by Minerals Separation machine the Wood process was investigated and the results obtained by this method on mixed sulphide ores were so much better than had previously been obtained with the Mineral Separation apparatus that installation of the Wood machine was adopted. Subsequently a laboratory type Callow machine was installed. This quickly proved its adaptability in concentrating ores of a siliceous type, such as the Quyon; but yielded results similar to the Minerals Separation machine with ores that contained a large proportion of other sulphides. It is altogether probable that the Mineral Separation machine would prove of equal value with the Callow in concentrating siliceous ores; but as both were surpassed by the Wood machine on mixed sulphide ores the Mines Branch naturally adopted the process of more universal application.

Because the Quyon ore is at present one of the siliceous type, its concentration is comparatively simple, and the success with which the operators are meeting is due more to this fact than to any particular merit attached to the Callow cell.

That the Quyon ore does not fall within this class is simply re-stating that their problem of concentration is comparatively simple, and their success is due more to this fact than to any particular merit attached to the Callow machine.

A "little" knowledge is a dangerous thing, and it may be permissible to advise your anonymous correspondent that a careful study of the various types of molybdenite ores to be met with in Canada and the

United States would lead to considerable enlightenment as regards the respective merits of both the Oil Froth and Water Film flotation methods in their concentration.

Yours, etc.

Geo. C. Mackenzie.

Ottawa, Oct. 2, 1917.

#### MINE OWNERS AGREE TO POOL LEAD.

About four weeks ago Mr. J. J. Warren, of Trail, West Kootenay, B. C., managing director of the Consolidated Mining and Smelting Company of Canada, Ltd., sent to lead producers of the Kootenay districts a circular calling attention to the situation in regard to the sale of lead, and invited those directly interested to meet to discuss the matter. The circular read as follows:

"The Imperial Munitions Board has notified us that on account of a reduction in shrapnel orders, it will not be requiring anything like the quantity of lead per month that it had been purchasing for the past many months. It also asks us to sell it any lead needed for munitions purposes at the price fixed by the United States Government for lead purchased from United States producers.

"As the present commercial needs of Canada do not require anything like the present production of lead, and as there seems to be a certainty of decreased consumption of lead for munitions purposes, the situation is serious and calls for immediate and careful attention."

On Sept. 21, the Nelson Daily News printed the following account of the meeting:

In order to hold the Canadian market against American producers, lead mine operators of Kootenay agreed yesterday to pool their output with that of the mines owned by the Consolidated Company and accept the average price received for the metal.

Up to the present time the Consolidated Company, which operates the lead smelter at Trail, the only plant of the kind in Canada, has been paying independent producers on a basis of the lowest American price, which is that of St. Louis, plus freight and the Canadian duty of 22½ per cent. The Consolidated Company's own mines supply about one half of the lead produced at the Trail smelting works, the remainder coming from independent producers.

American producers have been selling to the British Government, the chief purchaser of lead, at a price representing a cut on the artificial quotation established by freight and duty plus the St. Louis price. Hence the Consolidated Company, in order to secure the Canadian market, which is largely the market in Canada offered by the Imperial Munitions Board, had to compete. To enable it to do that, it has asked the independent producers to consent to the pooling arrangement.

A meeting attended by most of the larger independent producers took place in Nelson yesterday, when the company's proposal was placed before them. It was unanimously agreed to.

#### THACKERAY GOLD MINING CO.

Cobalt, Oct. 8.—The Smith claim and six others in the immediate vicinity of Lot 4, Con. 3, Township of Maisonneville, have been purchased by the Thackeray Gold Mining Company, and active operations are to begin at once. Several promising veins are in evidence on the property just acquired by the company. The company has commenced moving prospecting equipment from claims in Thackeray township to the new location, which is about one mile south of the Murray Mogridge.



# “Northern Miner” and “Toronto World” Say Minerals Separation N. A. Corporation Is Controlled By Germans

The following is an extract from statements made in the “Northern Miner,” Sept. 29th, and republished in the “Toronto World,” Oct. 4th:

“There is a company known as the Minerals Separation North American Corporation which claims to control patents in this country on a process known as the flotation process which has become one of the most successful methods in use for the extraction of metals from many ores. This company is controlled in North America by Beer, Sondheimer & Company at 61 Broadway, New York City, and, as a number of Canadian mines have adapted flotation to their ore treatment during the past three years, they are now being threatened with litigation which may prove very costly to the mining industry and to the country at this critical time.

“After a thorough investigation into the personnel of Beer, Sondheimer & Company, and discovering that it is German from stem to stern, the Northern Miner urges the protection of the government from these enemies of the empire on the ground that if flotation is controlled by patents held by Minerals Separation North American Corporation or Beer, Sondheimer & Company such patents should be annulled forthwith, as apparently their sole aim is to hold up the production of minerals in Canada, by placing the matter into litigation and thereby tying it up in the courts, such as was done in the United States. It is interesting to note that any decisions upholding the validity of these patents have been purely technical, and have served no other purpose than to continue the obstruction of war metals. To date they have been unable to collect any claims through the American courts.

“We have it on good authority that Beer, Sondheimer & Company of New York City, which is now threatening to hold up the Canadian mines, is in reality Germany’s mining and metal representative on this continent. A chart of the German metal buying organization throughout the world is published by the federal trade commission of the United States, and on this the name of Beer, Sondheimer & Company is prominently mentioned. German influence in the mining world has always been strong. It was deeply entrenched in Australia, where agents of the Kaiser controlled the zinc production until the government very properly confiscated their holdings.

“Considerable suspicion arose in the minds of mine operators in Canada that Beer, Sondheimer & Company were enemies of the empire long before the United States entered the war. Prior to August, 1914, they had been heavy exporters to Germany of ores and metals in different stages of refinement. That they shipped greatly needed metals to Germany, such as lead, zinc, copper and nickel, was generally believed, and later these suspicions were verified when a black-list was published by the British Government with the name of this company appearing prominently as one of our enemies.

“Now we encounter the peculiar paradox of this Hun-branded outfit about to launch action in the

courts to obtain money alleged to be due as royalties from Canadian mining companies.

“Shortly after the outbreak of the war, at the time when manufacturers were urged to convert their factories into munition works, it was up to the mines to speed production. The flotation process was installed by a number of companies, as it was decidedly more efficient than any method of metal recovery than had hitherto been tried for many ores. Flotation has therefore had a great deal to do with the largely increased mineral output, especially in view of the tremendous scarcity of skilled labor.

“It naturally has always been the aim of Beer, Sondheimer & Co. to discourage as far as possible the production of war metals in the United States and Canada. Being loyal to the Kaiser, they have worked with all their might and main, with the large coterie of pro-Germans in the United States, to help the fatherland. They did not lend the assistance towards the adaptation of the process which good business most assuredly would have justified. The motive is quite clear.

“But American inventors entered the field. They built machinery improving the flotation process. Several large copper companies installed this flotation machinery, and the ratio of recovery of the metal content showed great leaps. But Beer, Sondheimer & Co. were not caught sleeping. They brought action against these copper companies, as they are now contemplating in Canada, claiming such big royalties that many other companies figuring on the installation of the process decided to wait until the litigation was settled. As a result many copper and other mines of the United States and Canada, which could profitably use the process and help relieve the shortage of war materials, are now producing the same quantities as they could if the alleged patents did not exist.

“It is indeed interesting to note how the flotation process happened to be installed in some Canadian mines. At the beginning of flotation history in Cobalt, samples were sent by Cobalt mines to the Minerals Separation American Syndicate Inc., which just a short time ago made a slight change in its name. After testing the samples submitted, Beer, Sondheimer & Co., the German company which were sole agents, turned down the ore on the ground that the flotation process could not successfully treat it. Cobalt mines were bent on producing as never before because of the demand for metals, but it was quite evident that they could expect no help from the German headquarters in America. Later samples were sent to J. M. Callow at Salt Lake City, who, after testing with his machine, reported that Cobalt ores were subject to treatment by flotation. Mr. Callow opened a branch in Cobalt shortly afterwards, and in conjunction with the mine managers, brought about its successful adaptation.

“The Cobalt mine managers were aware that the Minerals Separation American Syndicate Inc., had basic patents which they claimed covered the use of the flotation process in Canada. United States mines, which



were then in the same position as the Cobalt mines are to-day, were fighting the German-controlled company in the courts. At the time that Mr. Callow's experiments were successful the mine managers were on the point of dealing direct with the agents, Beer, Sondheimer & Co. of New York, but before any decision was reached the British Government had blacklisted this company as an enemy of the empire. And now after paying no attention to the Canadian mining field for three years, this German outfit has shown the colossal impudence and gall to demand royalties."

# **"WORLD" SAYS PROCESS GERMAN AND CONTROLLED BY GERMANS.**

On Sept. 28, the "Toronto World" published the following:

"The miners of Northern Ontario are finding themselves in the grip of the Metalgesellschaft, the great German metal trust with headquarters at Frankfurt-on-the-Main. This trust, founded by the late Wilhelm Merton, absolutely dominated the metal markets of the world at the outbreak of the war. Its agent, Henry S. Merton Sons, Ltd., of London, England, was the buyer of metals for the British Government, and yet even after the war commenced assisted in smuggling large cargoes of zinc from Australia to Germany. The Metalgesellschaft absolutely controlled the zinc concentrates of Australia, and had a strangle hold on many of the mineral companies of the United States and Canada.

"Quite recently Dr. Christopher Addison, of the British Government, declared that Germany had by no means released her grip on the international metal situation, and we find German influences tying up mineral production in New Ontario, and threatening many Ontario mining companies with ruin.

"Most astonishing of all is the fact that the courts of Canada are to be used to help the Germans curtail our mineral production. Germany naturally does not desire war metals or precious metals to be produced in this country while the war is in progress. The Kaiser himself can scarcely come into a Canadian court and ask for help in blocking the allies, but a German company with an American charter may do this very thing.

"The situation is set forth with great clearness and ability in the last issue of The Northern Miner, of Cobalt, which seems to have all the facts at its finger ends. Many of these facts can be easily established, and they will be found to be confirmed by official reports of the U. S. Government.

"There is a German company in the United States, known as Beer, Sondheimer & Co., with head offices at 61 Broadway, New York City. This concern figures as the right arm of the Metalgesellschaft in the elaborate chart published a year or two ago by the United States Federal Trade Commission. The firm is not only German in personnel and sympathy, but is on the British blacklist. It was blacklisted because, after the war commenced, it succeeded in sending over copper, zinc and nickel to Germany.

"Now this firm is applying to the courts of Canada for writs of injunction and by other legal processes threatens to hold up and virtually paralyze the mining production of our north country. Through its agent, The Minerals Separation North American Corporation, it claims to own and control the process known as "flotation." Its claim is entrenched by patents originally German, secured before the outbreak of the war from the Dominion Government.

"Flotation is a process that has been used in the treatment of ores principally as an auxiliary to the old methods. The ore, as pulp, is mixed with oil and water, and air is then supplied, with the result that the small oil-coated bubbles carry the metallies to the surface. To instal this process at the mines is a matter of only a few thousand dollars, but the extra values recovered from the ores by its use may run into the millions. Also many low-grade deposits have become profitable owing to this wonderful scientific discovery. For this process the world is indebted to Germany, but the owners of the process, instead of collecting a reasonable royalty, are bent upon preventing the use of the process in the United States and Canada, during the war.

"They have been operating with a high hand in the United States. Many copper companies using flotation or an improved process along the same line, of American invention, found themselves held up by injunctions and other vexatious litigation, and sued for fabulous sums by way of damages. Other companies that desired to avoid trouble, and were quite willing to use the process at any reasonable price were asked to pay such ruinous royalties that they preferred to let their mines lie idle until the litigation was ended. The litigation, by the way, has been prolonged by every device known to able lawyers, with the idea of curtailing the production of metal in the States during the war.

"Flotation has been extensively used in our north country during the past three or four years, partly because it rendered valuable many low-grade ores that could not be otherwise profitably worked, and partly because scarcity of skilled labor and engineering talent made its use imperative. Probably no class of men enlisted so freely for service in our armies overseas as the men engaged in or connected with mineral production in Northern Ontario.

"The Minerals Separation North American Corporation has an American charter, and by the comity of nations has an undoubted right to sue in our Canadian courts. It could probably make out a prima facie case for an injunction, and it will endeavor to collect ruinous damages. It is undoubtedly controlled by Beer, Sondheimer & Co., the German-American firm already mentioned, which occupies a prominent place on the British blacklist. But it will come into court without disclosing this fact, and for that matter it may be doubted whether Beer, Sondheimer & Co. could not maintain the suit on its own behalf. That firm is blacklisted, but it may not be technically one of the King's enemies as would be a subject of the German emperor. It might, and probably would be difficult for the miners of New Ontario, without great expense, trouble and delay, to prove that Beer, Sondheimer & Co. is a finger upon the hand of the Metalgesellschaft, although in view of the official publications of the United States Government that fact could be ultimately established.

"But while this litigation is going on and these questions are being investigated, mining production in New Ontario will be checked and so far as some companies are concerned, will be suspended altogether, until the war is over. The litigation will not be brought in good faith to collect money due, or vindicate property rights from aggression, but will be brought solely for the purpose of hindering and delaying the metal production of Canada. The end in view will be to embarrass the allies by curtailing the supply of metals they can receive from Canada and thus help the Kaiser and the Huns.



"There is great excitement, therefore, in our north country, and the miners are about to appeal to Ottawa. They say that these German-American companies can only get a standing in court from the fact that they have Canadian patents. They will therefore demand that the Dominion Government cancel these patents, and in common justice and equity the cancellation should be made effective from the commencement of the war. It would be absurd and indefensible to permit Germany to hold up our mines and seriously curtail the output of our mines by reason of a monopoly in the way of a patent granted to Germans before the war by the Dominion Government. The north country will therefore appeal to Ottawa, and the result of their application will be watched with keen interest, not only by the mine owners directly affected, but by the governments of the entente allies, and by the governments of the central powers as well. Shall this peaceful penetration of Canada by the German metal trust be allowed to impair the efficiency and to some extent destroy the usefulness of Canada in the war?"

#### **MINERALS SEPARATION NORTH AMERICAN CORPORATION DENY CHARGE MADE BY COBALT AND TORONTO NEWSPAPERS.**

In response to enquiries concerning these charges the following statement has been given out by the Corporation:

In behalf of the Minerals Separation North American Corporation, who claim to own and control all of the North American basic patents for the flotation process, you are authorized to publish an absolute and unqualified denial of any and all assertions that this company is a German concern or a pro-German concern or in any way influenced or owned or managed or controlled by any German or alien-enemy interests.

This corporation was organized under the laws of the State of Maryland in December 1916 with the full consent of the British Government, specially had and obtained in September 1916, as the successor of Minerals Separation American Syndicate (1913) Limited, a British company.

The directors of Minerals Separation North American Corporation, since organization, are: John Ballot, chairman and managing director of the parent company Minerals Separation, Limited, and chairman and managing director of the former American Syndicate (1913) Limited, S. Gregory, director of Minerals Separation, Limited, and vice-chairman and managing director of the former American Syndicate (1913) Limited, Frank Altshul, partner of the firm of Lazard Freres and an officer in the American Ordnance. These are the only directors and they have absolute control of the affairs of the company. There is not a single alien-enemy shareholder of the corporation.

Until August, 1916, the British company, Minerals Separation American Syndicate (1913) Limited, was represented in America by Agents with the special authority of the British Government. As an incident of the organization of the present American Corporation that agency and representation were discontinued.

The policy of the company always has been and now is to encourage the production of metals and particularly those needed for war purposes.

With the decisions now in favor of the Corporation and its undoubted right to seek and obtain preliminary injunctions against infringers, it has refrained from doing so, solely for the purpose of not hampering the industry and not reducing the output of metals so

vital to the successful operation of the Allied Powers. A recent example is the consent that has been given to the continuance of infringement by the Butte & Superior Mining Company until the termination of the suit against that company. The court had adjudged the absolute right of Minerals Separation to an injunction; but it was stated by counsel for Minerals Separation that if this injunction would cause a shut down of the defendant's mill the plaintiff would consent to such terms as would permit defendant's infringing operations to continue pending the termination of the suit. The defendant admitted that the injunction would cause a shut down and the only question debated was what these terms should be. The Court ordered the filing of a bond for \$2,500,000 and the monthly deposit in Court of all profits from operations of the defendant. A few days later it was stated by the president of the Butte & Superior Mining Company that the bond ordered by the Court could not be obtained and it was suggested that in lieu of the bond the defendant should submit to an injunction against disposing of its assets otherwise than in the ordinary course of its business pending the termination of the suit. This was consented to by Minerals Separation, although it involved relinquishment of absolute security for \$2,500,000. This consent awaits the approval of the Court and therefore no further particulars can be given at the present time.

The fact that the output of metals in North America, Australia, South America and Russia has been enormously increased by the use of flotation and the cost of production greatly diminished are so well known to the mining and metallurgical world that no further statement in this respect needs to be made.

The company stands ready to license any and every responsible concern to utilize its process for the benefit of the Allies and to increase as much as possible the production of metals.

#### **H. D. WILLIAMS SAYS CHARGES FALSE AND MALICIOUS.**

The following letter, dated Oct. 4, has been received by Messrs. Ridout & Maybee, Toronto, from H. D. Williams, counsel for Minerals Separation North American Corporation:

Your telegram received. Since writing you I have seen and have shown to our client, Minerals Separation North American Corporation, the articles in the "Toronto World" of September 28 and 29 and October 1, charging that our clients are controlled by German interests and are unwilling to grant licenses for the use of their processes in Canada. These charges are wholly false.

In their behalf and largely of my own knowledge I make the following statement for the information of the Canadian public.

When the present war broke out, in 1914, Minerals Separation American Syndicate (1913) Ltd. a British corporation, the predecessor of our company, was represented in America by one of its directors, Dr. S. Gregory, assisted by the American branch of the German firm of Beer, Sondheimer & Co.

Mr. John Ballot, the Chairman of our predecessor as well as the parent British company and the president of the present company, immediately and personally submitted to the British Government in London a statement of all the facts, among which was the agreement imposed upon the American branch of Beer, Sondheimer & Co. that their work as agents of the British

company should be carried on entirely separate and apart from any German connections or interests. The full explanation given, with the relevant agreements exacted, satisfied the British Government, and permission was granted to continue the relationship during the war.

Early in 1915 the American branch of Beer, Sondheimer & Co., incorporated its business under the laws of the State of New York as Beer, Sondheimer & Co. Inc. With this corporation Minerals Separation never had any connection whatsoever. It was insisted that the special agency contract as approved by the British authorities be kept separate, and Messrs Elkan and Frohnecht, both American citizens residing in New York were substituted to conduct this sole agency up to the time when it was discontinued.

Thereafter the corporation Beer, Sondheimer & Co. Inc. was temporarily placed in the British blacklist, but subsequently removed therefrom upon representations which satisfied the British Government of their neutrality. It may be added that Beer, Sondheimer & Co. Inc. have never been on a blacklist of the United States Government, and have had and continue to have friendly relations with the United States Government at all times since the United States entered the war.

The agency contract between Beer, Sondheimer & Co. American Branch and Minerals Separation American Syndicate (1913) Ltd. was made in 1913, when England and Germany were at peace. It was a ten year contract and it continued in force until the outbreak of the war, when, by the authority of the British Government it was modified as above indicated before the present corporation Minerals Separation North American Corporation was formed, when it was cancelled by mutual consent, and again with the special permission of the British Government. Since December 7, 1916, Minerals Separation North American Corporation has directly managed and controlled all of its business in North America under a board of three directors, two of whom are British subjects, and one of whom is an American citizen and a Lieutenant of Ordnance in the American Army.

The stockholders of Minerals Separation North American Corporation are all either British subjects or American citizens.

As to the patriotism and loyalty of the officers and directors of Minerals Separation Ltd., there can be no breath of suspicion. One of their directors as aforesaid is an officer in the American army. The company was a liberal subscriber to the Liberty Loan. Its process has contributed very largely to the increased output of metals in America, and it stands ready to license the use of its process by any and every responsible mining concern. Its rates of royalty are admittedly reasonable. The exercise of its rights under its patents has never in any instance checked the output of metals, even where that output was in adjudged infringement and defiance of its patents. The British officers and directors, Mr. John Ballot and Dr. S. Gregory, are also directors, and Mr. John Ballot is Chairman, of the parent company, Minerals Separation Ltd. of London, England. This company has its chief engineer and practically all of its staff enlisted in the British army, devoting all of their engineering skill to the services of the British Government, while receiving half pay from the company. Our American company has also notified its staff that any member joining the American Army will have his position held open and will receive half pay during the war.

The charges which have appeared in the "Toronto World" are false and malicious in every respect. They appear to have their origin among miners who wish to use the patented process of our company without the payment of royalty.

Yours etc.

Henry D. Williams.

Counsel for Minerals Separation North American Corporation.

### JUDGE BOURQUIN'S DECISION IN MINERALS SEPARATION CASE.

Commenting on the decision handed down by Judge Bourquin, "Mining and Scientific Press," San Francisco, says in part:

Judge Bourquin's decision turns, as was expected on the definition of the so-called 'critical proportion,' the phrase expressing a supposed limitation to the quantity of oil efficacious in froth-flotation. By accepting this supposed limitation the Supreme Court was, we believe, misled into an erroneous inference. Judge Bourquin places his own interpretation on the dictum of the highest court; he argues that "small deviations from the predetermined amount," namely, the critical proportion of oil, are injurious to the operation of the process, and in saying so he sets aside the evidence of work done successfully with proportions of oil that make the use of 'critical' ridiculous. Yet he acknowledges that "the process can be fairly successfully operated with 1% or more of oil," insisting, however, that "the excess of oil is useless, wasteful, and harmful," and merely a means of escape from infringement.

As regards the use of a particular kind of violent agitation, to which the Supreme Court confined patent 835,120, Judge Bourquin has a variant notion. He refuses to distinguish between "applied agitation," that is, "by beating air into the mass" with blade-impellers, and "self-agitation," such as is "set up by the air particles themselves in merely rising through the mass" of pulp. It is not necessary to comment on this phase of the process to anybody that has compared the working of a Minerals Separation machine with that of a Callow cell.

The decision is sweepingly in favor of Minerals Separation and in accord with the same judge's decision in the Hyde case—a decision reversed by the Appellate Court in San Francisco. Judge Bourquin asserts that "the great mass of new evidence herein is but cumulative of the Hyde suit." We have read the record in both suits and have found much that seemed different to an important degree.

This latest decision of the courts is calculated further to undermine public confidence in the judicial interpretation of the patent law. Not only has it become manifest that it is against the community interest to grant the monopoly of a process to patentees themselves ignorant of the underlying principles of their supposed invention, and therefore undeserving of a blanket right to collect royalties from those that introduce vital improvements, but it is clear that contests over the validity of patents and the infringement of them should be tried by judges having special qualifications, such as a scientific training, including a thorough familiarity with the fundamental principles of chemistry, physics, and mechanics. If all such cases could be settled on questions of law, the need for scientific acumen would not arise, but it is obvious that in these flotation suits the judges are asked to



swim in waters wherein heretofore some of them have not waded, in waters by which they have been scarcely wetted.

Commenting on the same decision the "Engineering and Mining Journal," New York, says in part:

The arguments of the learned counsel in the interminable flotation litigation, and Judge Bourquin's recent decision, remind us of the ancient theological controversies. We have no patience with it.

The flotation litigation was carried up to the Supreme Court of the United States, which in itself was an unusual event. The Supreme Court rendered a decision upholding the Minerals Separation patents upon the use of less than 1% of oil plus a certain kind of agitation. Whether anybody dislikes that decision does not matter in the least. It stands as the decision of the highest court and is to be obeyed and respected accordingly.

The Supreme Court was perfectly clear regarding the matter of less than 1% of oil. It was the patent claims so reading that were upheld. The claims that specified simply "a small quantity of oil" were declared invalid.

The Supreme Court was not equally specific about the matter of agitation. The Minerals Separation consequently pushed its suit against the Miami Copper Co. which involved that question and won its case on appeal to the Philadelphia court. Unfortunately the Miami Copper Co. did not present a clear-cut case with respect to the Callow process, the status of which has not yet been legally defined. The Philadelphia court intimated, however, that in its judgment the Callow process involves a kind of agitation that is different from what the Supreme Court contemplated.

Meanwhile, Butte & Superior changed to the use of more than 1% of oil and Minerals Separation brought suit against it, claiming that to be an infringement of its patents. Last week we remarked that Judge Bourquin's decision seemed to us to be contrary to the letter of the ruling by the Supreme Court. Mr. Williams, the distinguished counsel for Minerals Separation, has objected to that characterization, alleging that the Supreme Court's decision protects Minerals Separation against the use of any quantity of oil when the results obtained are the same as with less than 1%. We are unable so to read the decision of the Supreme Court, and look upon such a claim as a species of the quibbling that we find so irritating.

Judge Bourquin, however, falls right into this. What shall we say of the mind, which, after quoting the Supreme Court as saying that the patent must be confined to the results obtained by the use of oil within the proportion amounting to a fraction of 1% on the ore, and holding invalid the claims that simply refer to "a small quantity of oil," says, "It seems clear neither patent nor decision undertakes to say the process depends upon less than 1% of oil or is inoperative with 1% or more of oil?" Judge Bourquin's reasoning and his decision follow this line.

With all due respect to the learned judge, we do not think that he viewed the case in the light of common sense.

The several decisions of the American courts in the flotation case have exhibited much clever analysis and clear reasoning. Judge Bourquin's recent decision is the poorest contribution to this juridical literature. We do not think that the loser will be content to let the matter stand as it does now.

Sulman, Picard and Ballot, who obtained the basic patents now owned by Minerals Separation, are en-

titled to the highest possible credit for carrying forward the early work of others in the field of flotation to a brilliant outcome in the laboratory. The management of Minerals Separation exhibited great skill and perception in collecting a far-reaching group of patents pertaining to the new art. With bulldog persistence they have fought their case through the courts of Australia, Great Britain and the United States. No fair-minded person ought to want to deny them the rights that the highest courts have given them. But when, in the same breath, Minerals Separation asserts that the use of more than 1 per cent. oil gives woefully inferior results as compared with the use of less than 1 per cent., and yet claims the right to collect royalty on the use of any quantity of oil, in certain ways, there is created a feeling that hoggishness is being exhibited. While the mining public ought generously to admit the service that Minerals Separation has rendered to it, that company ought on its own part to recognize the service that mining and mill men, especially those of Broken Hill, rendered to it in making a commercial success of its process. In this, as in many other new steps in metallurgy, there was a big gap between the idea and the successful development of it in practice. The enormous success of the flotation process of ore concentration, which is admittedly one of the major improvements of all times in metallurgy, is the result of the work of many men.

#### PRESIDENT BALLOT DENIES CHARGES.

President John Ballot has made the following statement concerning the statements circulated by the "Northern Miner" and "Toronto World":

Rumors have been circulated to the effect that Minerals Separation North American Corporation is dominated or controlled by German influences. These rumors are absolutely and unqualifiedly false. There is no alien-enemy ownership, control or influence in the affairs of this corporation, which are entirely managed and controlled by a board of three directors, viz.: John Ballot and Dr. S. Gregory, British subjects residing in New York, and Frank Altschul, an American citizen, and Lieutenant of Ordnance in the American Army, who is a partner in the well known banking firm of Lazard Freres. The certificate holders of the corporation are all British subjects or American citizens.

The basis of these rumors appears to be a connection no longer existing, arising out of a contract made during 1913 with Beer, Sondheimer & Co., of Frankfurt, Germany, when Great Britain and Germany were at peace, whereby the American Branch of that firm became the sole American agents for our predecessor, Minerals Separation American Syndicate (1913), Ltd., a British corporation. This agreement was made for a period of ten years, but on the outbreak of the war the connection with the Frankfurt firm was immediately discontinued, while that with the American Branch was continued by special license and consent of the British Government, and remained effective till December, 1916, when, upon the formation of Minerals Separation North American Corporation, it was terminated.

From early 1914 onwards the company was directly represented in the United States of America by its directors, and since the formation of the American Corporation it has at all times managed and controlled its own affairs without any intermediary or agent.

Minerals Separation North American Corporation,  
JOHN BALLOT, President.



### IRON AND STEEL.

The Iron Age says: Since announcement of prices agreed on by government and leading producers the trade has been in utter confusion. Surprise that prices were agreed on rather than imposed was followed by excited efforts to get details which thus far are lacking, and meanwhile business practically stopped.

While only six products are included in announcement, including the three forms of finished steel the government will buy most largely, prices on other products will be worked out and put into effect later. On billets, a pivotal intermediate product, strangely omitted, a \$15 advance over pig iron may fairly be expected. In two products not yet fixed—wire and wrought pipe—market prices lately maintained by leading producer would be nearly in line with new schedule.

Because of large tonnages on books, much of it at higher prices, there is the view that the new schedule will have little effect for some time on private transactions. Yet there are contracts on which monthly settlements are based on current market quotations. These will automatically be adjusted to agreed prices, and effect on other contracts is not to be overlooked. But the situation is unlike that of past declines, since buyers who might fail to specify on contracts cannot now find hungry mills waiting to supply them.

For manufacturing consumers of steel whose products have not advanced in proportion to steel, the new prices meet a situation that was increasingly difficult. But now there loom up the priority regulations from Washington and prospect that with increased buying from the allies at the low prices, there will be less material for distribution to non-war industries. Government control of steel works output is tightening steadily and it is intimated even licenses to buy may in time be required.

Much of the upheaval over the new agreement was due to vagueness of the Washington statement. The iron ore price of \$5.05, it develops, applies to non-bessemer Mesaba ore and is the same as contract price for 1917 shipments. The \$33 pig iron price, it is explained, is for basic or No. 2 foundry iron at northern furnace. On other grades differentials will be worked out by pig iron committee. On southern iron the furnace price will be made low enough to allow for freight to the North.

That prices named are to be made effective promptly on new transactions appears from quoting of basic pig iron at \$33 at valley furnace by two producers in central West and sale of 5000 tons of bessemer at \$36.30 at furnace, the tentative differential on bessemer being put at 10% over basic. Several producers of foundry iron announce willingness to book orders at \$33 for No. 2, against \$50 one week ago.

Before the new prices were named eastern Pennsylvania furnaces sold 5000 tons of basic to one steel company and 4500 to another at \$45, delivered. In one case the steel company has a government contract on a cost-plus basis.

Coke producers have started promptly to establish the \$6 basis. On two contracts which call for fixing of price according to the market from day to day, shipments have already been made at \$6. However, the coke trade is well booked ahead and there will be no large amount of \$6 coke available for some time. Only recently long-time contracts were entered into at \$8.50 and are expected to be carried out.

Raising of government price on coal is pointed to by \$6 price for coke and by fairness of agreements on cop-

per and steel, and \$2.50 and \$2.75 are suggested prices, a new argument for advance being furnished by extravagant demands of bituminous miners.

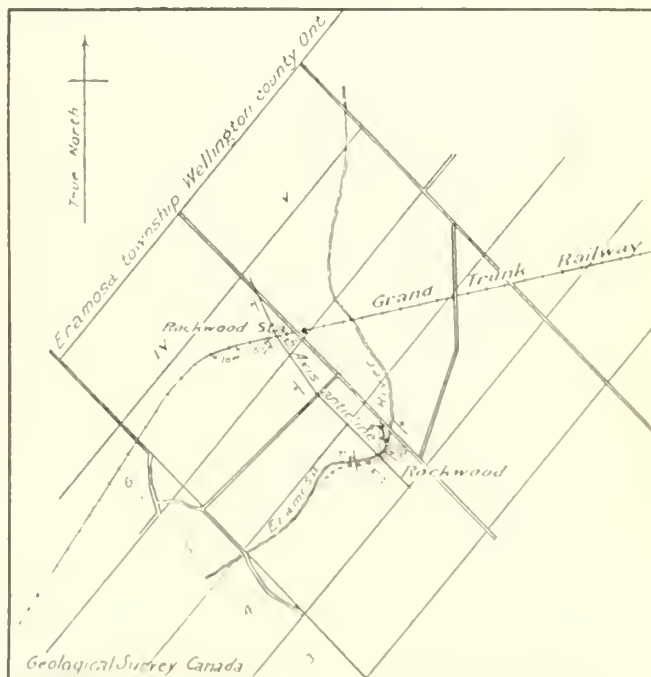
Steel and other committees of American Iron & Steel Institute will resume activities within a week, now that the industry has been put on a co-operative basis, and prices of all iron and steel mill products will be worked out. Apparently the government expects the large producers, under their agreement, to stimulate production, to find a way to supply raw materials to smaller producers in certain lines, particularly plates, so that they can take their share of government and allied contracts.

It is estimated 7,000,000 tons of steel products for government and allies will be scheduled in next 60 days to be provided for by steel companies in coming year.

Offering in United States of Canadian billets has been cited as indication of supply there overtaking demand. Yet it is known the British government is inquiring for 400,000 tons of shell steel from the United States and has yet to take 600,000 tons on existing contracts.

### WILL DRILL FOR OIL AT ROCKWOOD ONTARIO.

In the "Canadian Mining Journal" of July 15, 1917, Mr. M. Y. Williams described the Rockwood anticline and stated in conclusion: "The anticline at Rockwood is the best defined of any known to the writer in south-western Ontario, and affords a favorable location for prospecting for oil or gas." It is said that options on over 20,000 acres have now been secured on this locality by the Imperial Oil Company and others and that drilling will be commenced shortly.



Sketch map of Rockwood and vicinity,  
to show anticline at top of Niagara.  
Approximate scale of miles.

### FRASER ASBESTOS MINE REOPENED.

The Asbestos Corporation of Canada has reopened the old Fraser mine in Broughton township and is installing a mill.

### BENNET-MARTIN CHROME AND ASBESTOS MINE.

A company with the above name, capitalized at \$1,500,000 has been organized to work chromite and asbestos deposits in Quebec.



# The Cost of Coal

By F. W. Gray.

The following clipping from a recent issue of the New York "Herald" contains more truth than is usual in newspaper items concerning the coal trade. The newspaperman's point of view is rather ingenuously inserted in the concluding sentence of the quotation, which is as follows:

"Lack of modern business methods on the part of many of the coal operators of the United States, it was learned to-day, may necessitate a revision in many sections of the country of the prices fixed recently by President Wilson.

"Between forty and fifty coal operators from Tennessee and Kentucky admitted to-day to the Federal Rate Commission that it is impossible for them to ascertain from their books how much it costs them to mine their coal.

"These men appeared before the commission to protest against the figures fixed by President Wilson and asserted that such prices are so low that they will be forced to close down their mines. The commission called their attention to the fact that the operators had furnished the cost sheets on which the estimates of the commission had been based. It then developed that few, if any, of the operators keep systematic accounts of their receipts and expenditures. They were unable to give satisfactory explanations of the methods by which they had arrived at the figures originally submitted to the Federal Trade Commission. The only explanation suggested for such laxity of methods as those admitted by these operators is that they have been making such large profits as to make entries of expenditures entirely superfluous."

It is a moot question whether even those coal companies that pride themselves upon an up-to-date accounting system really know the ultimate cost of their product to themselves. It has been an astonishing feature of the fixing of prices in the United States to realize that well-informed public officers could ever have considered that \$2.00 per ton was a fair maximum price for bituminous coal. In Pennsylvania when the figure of \$2.00 was first announced it was also mentioned that before the war a fair price for bituminous coal was \$1.00 per ton. How sensible men could ever have thought they were making a profit on mining coal and selling it for one dollar a ton—and in some cases less—is a mystery to Canadian coal operators. It is quite possible that after paying for the actual cost of the labor in mining the coal, and the cost of the material supplies, it was possible in many of the favored coal mines of Pennsylvania to show a profit per ton with a selling price of one dollar, but, here lies the fallacy, the ultimate cost of coal to the producer is not complete when the items of labor and material are enumerated. The ultimate cost of coal should include provision for the full return of the capital invested, and reserves against the day when the coal areas approach exhaustion, when new areas must be acquired, or operations cease entirely. The truth is that coal is being sold, and has been sold without any allowance for the future, and merely from the standpoint of the operator who happens to be mining for the market at a given period. No fair appraisal of the cost of coal is possible unless the calculation extends over the whole life of the mine in

question. One might in some cases go even further, and state that such a calculation should take into account the whole coalfield in which the mine under consideration is situated.

In every coalfield that has been worked for any length of time there will be found abandoned collieries, forgotten areas, drowned sections, deep coals, thin coals, coals of meagre quality; the leavings and debris of profitable operations of long ago. When mining conditions become unprofitable and difficult, the operators move to more favored and newer territory, and the same vicious cycle commences. There is no particular nemesis until all the areas become partially exhausted, and then suddenly the operators and the public awake to a coal shortage and a great advance in prices. This condition of affairs has not yet arisen in the United States; indeed, so generous has nature been in her provision of coal there, that many years will pass before the country realizes fully what has happened, and realizes moreover that for many years coal was being sold and used at prices much below the actual cost of production. It may be quite frankly stated that coal has not and could not be mined at a legitimate profit and sold for a dollar per ton within the past ten years. Coal has been sold at less than a dollar per ton, and the operators have made money, but nevertheless that particular coal was sold below cost, and some day it will have to be paid for with interest.

A coal company, properly run and properly conceived, should when it finishes its life, have in its treasury every cent that has been expended in machinery, development and equipment, plus enough money to acquire a new coal area as large as that exhausted, and should during its career have paid out a reasonable interest return to its shareholders in the form of dividends. Did anyone ever hear of such a coal company? There are coal companies paying out large dividends, and many coal companies are envied because of their supposed prosperity. Yet if the accounts of these companies were properly kept, if the books made ample and proper provision for the future, either the dividends would have been less, or the price of coal to the public would have been greater.

If the Fuel Controller in the United States can keep down the price of bituminous coal to two dollars per ton, then the United States is to be congratulated, because nowhere in the civilized world is such a price possible for this essential raw material. If coal is properly burned, it should be possible to get more than two dollars per ton out of the by-products alone. When coal is bought and consumed to-day for two dollars a ton, it may be regarded as cheap fuel; so cheap that part of the bill will have to be paid by posterity.

The world will have to revise its opinions on the value of coal. In Europe it is many years since anyone, even coal operators, thought of coal in figures approaching a dollar or two dollars per ton. Over there coal is becoming appreciably scarcer, and, apart altogether from war conditions, has been steadily appreciating in cost year by year. Thanks to the fact that coal mines in Europe have in many instances been under the control of one family or one company for

periods approaching a century there has been established sufficient data to give some idea of the true cost of coal over long periods, and the necessity for proper reserves for depreciation of machinery, depletion of areas, amortization of capital, and future development, has been learned from experience. In the United States, and in Canada also, the process of industrial consolidation and mergers has obscured the data. Coal companies have added area to area and property to property. When a mine has become unprofitable it has been closed down and another one opened. Frequent changes of management and control have militated against long views and the perspective that experience gives. Properties have not been conceived as a whole. Their future has not been thought out, and the vaguest ideas have prevailed as to the true cost of coal to the producer. In many cases the acquirement of coal properties by railways and steel companies, and the merger of coal interests into steel interests and transportation problems has further obscured opinion. To-day, however, some sort of equilibrium has been reached, and the progress of industrial consolidations is not so rapid as it was some years ago.

The time seems to have arrived for a new viewpoint on the cost of coal; a viewpoint that will be based as much on the intrinsic value of the article, as on its apparent cost of production. If the edicts of the Fuel Controller in the United States do nothing more than cause coal operators to make serious enquiry into the ultimate cost of the coal they produce, it will be a good thing. If such an enquiry leads to an increase in coal prices to the consumer, that is not to be deplored as much as leaving the consumer under a false impression of the value of the coal he consumes. Economy in the use of coal in North America will not come until its value is appreciated. Easy come, easy go. Coal has been too cheap. It has been used too wastefully. The coal operator, and not the consumer, is chiefly to blame for this, and when the "Herald" reporter heads his article: "Operators admit figures submitted were guesswork," he is repeating a simple fact, only, unfortunately, many operators have not found out that their elaborate mining costs are incomplete. It has always been accounted a crime to extort unreasonable prices for necessary commodities. Is it any the less wrong to sell commodities below cost, and put all the loss upon posterity?

### TO REVISE U. S. COAL PRICES.

Central coal operators in the United States competitive field have agreed to meet in part miners' demands on condition that government increase prices for coal at mines. Fuel Administrator Garfield is expected to revise coal prices upward so that wage increases may be paid. Chief point of difference now between operators and miners is how much of increase, if granted, shall be added to wages. Operators say that unless price increase more than meets wage advances, they cannot operate at profit.

### OPENING NEW COAL MINES IN ALBERTA.

During the year 27 new coal mines have been opened in Alberta. Sinking is in progress at the new mine of the Edmonton Collieries in the Clover Bar district. The North American Collieries has taken over and is operating the Red Deer Valley Coal Co's mine at Drunkeller.

### ST. LOUIS MEETING A. I. M. E.

St. Louis, Mo. Oct. 8th.—Means of conserving the country's war minerals and engineering conferences on war service subjects will feature the 115th meeting of the American Institute of Mining Engineers which convened here to-day. Several hundred of the six thousand members of the Institute are in attendance and throughout this week the convention will inspect the coal fields of Illinois, the zinc and other mining operations of Missouri and the oil fields of Oklahoma.

Wastage of natural resources, the human element and capital in the coal industry, was pointed out in the course of to-day's meeting by Francis S. Peabody, President of the Peabody Coal Company and chairman of the Committee on Coal Production of the Council of National Defense. Suggestions of other members of the Institute for economy in mining and handling the country's resources were along similar lines in addition to the discussion of plans for opening up mining operations in sections which might not be commercially profitable except in emergency times.

Ways of improving the economic situation in the coal mining industry were presented by Professor C. M. Young, of the University of Illinois. Professor Young said, "It is highly desirable in featuring the ultimate welfare of the coal industry that there should be some control of the markets and transportation. It would be far better for the fuel industry if there were some such control in this country as exists in some European countries, through which there should be a proper regulation of output and of markets, so that each district may have its share of the business. I have no doubt that the operators of Illinois as well as most other states would welcome such control if they could only feel sure that it would be a constructive one."

This afternoon the Mining Engineers held a patriotic meeting and this evening a banquet. To-morrow they will take a boat trip to Herclaneum in addition to a visit to coke plants and fire clay plants. Technical sessions will be held throughout the day.

St. Louis, Mo. Oct. 9th.—Increasing the country's production of sulphuric acid by two million tons, which can be made possible chiefly through the greater production of pyrites in this country, will be one of the principal war services of the American Institute of Mining Engineers, according to plans discussed at the second day's sessions of the Institute which is in convention here. Sulphuric acid, besides being a prime requisite in the making of ammunitions, is important as a fertilizer ingredient and to the chemical industry.

Government authorities at Washington have informed the Institute that 6,250,000 tons of sulphuric acid were produced in this country last year, and in order to prosecute the war without handicap in this country, it is necessary to increase this production to 8,000,000 tons during 1917. The principal pyrites mines are now located in Virginia, California and New York, but on account of transportation difficulties, the California deposit is almost unavailable. Last year 40% of the sulphuric acid production came from pyrites shipped from Spain, 6% from Canada, 13% from domestic pyrites, 22% from smelter acid, and 19% from native sulphur.

The country's pyrites supply is said by the Mining Engineers to be only second in importance to merchandising the supply of manganese ores for the American steel industry. The conservation of this mineral and methods to increase production are also considered by the Institute.



## PERSONAL AND GENERAL

H. E. T. Haultain, professor of mining in the University of Toronto, has been appointed vocational training officer for Ontario.

Mr. W. E. Segsworth, Toronto, has been appointed superintendent of vocational training of returned soldiers.

Capt. J. C. Riley is home on leave.

Major R. W. Coulthard expects to be home on leave shortly.

Lieut. W. M. Goodwin has been awarded the Military Cross for "conspicuous gallantry and devotion to duty."

Mr. Chas. F. Caldwell, of Kaslo, West Kootenay, B.C., who is largely interested in mines in Ainsworth mining division, left Kaslo on September 24 on a business trip to Chicago.

Messrs J. Charbonnier and Raoul Green, of the West Canadian Collieries, Ltd., Blairmore, Alberta, on September 25 visited the Joker mining property, situated at the head of the south fork of Kaslo creek, British Columbia. Years ago that property was operated by its French owners, who were also interested in coal mining Blairmore district.

Mr. R. W. M. Hunter, mining engineer, has returned to Victoria, B.C., after having been absent in other parts of Canada for about two years. He was in Nova Scotia for a while, and afterward visited mining districts in Northern Ontario and Manitoba.

Mr. C. H. Seymour Baker, who for some years has been investigating quartz occurrences in Cariboo district of British Columbia, recently returned to Barkerville, Cariboo, after having spent the winter in England.

Mr. R. G. Miln, formerly with the Tyece Copper Company and in recent months with the Ladysmith Smelting Corporation, is now superintending the development of the Blue Grouse mining property, situated near Cowichan lake, Vancouver island, which mine is making occasional small shipments of ore to the Ladysmith Copper Corporation's smelting works on Vancouver island.

Mr. E. W. Westervelt, formerly of Rochester, New York, is now superintendent for the Hobson Silver-Lead Mining Co., at Ymir, in Nelson mining division of British Columbia.

Mining and Scientific Press states that Mr. J. C. Houston had to resign as superintendent for the Dome Mines owing to ill health and is now examining mines in British Columbia.

The secretary of the Western Branch of the Canadian Mining Institute is arranging to hold a meeting of the branch at Merritt Nicola Valley, B.C., with a supplementary meeting to follow at Princeton, Similkameen. These meetings will probably be held on November 7th and 10th, respectively.

Mr. Thos. H. Rea, for some time engaged in mining in Ontario, is now superintendent of the Debenture group mining property situated in the Hazelton region of the Omineca mining division of British Columbia.

Mr. R. D. Fetherstonhaugh, of Calgary, who has been directing the development of the Copper Chief group of mineral claims in Trout Lake mining division, Lardreau district, British Columbia, returned to Alberta recently with the object, it is stated, of organizing a company to acquire and operate the Copper Chief property.

Mr. W. J. Elmendorf, for several years developing a mining property in Portland Canal region, British Columbia, but now of Seattle, Washington, has gone

to Copper River, Alaska, on mining investigation business.

The Granby News, the monthly publication of which the Granby Consolidated Co. commenced recently chiefly for the edification and information of its numerous employees, says: "Miles Barrett, foreman of the furnace department of the Granby Consolidated Co's. Grand Forks plant since the inception of smelting there on August 21, 1900, when the first furnace was blown in, and at present general foreman of the furnace and converter departments, has the honor of having been the first foreman of a copper smelter in British Columbia, as he came from the Great Falls smelter of Montana in 1895 and blew in the Hall Mines smelter at Nelson, B.C., on January 19 of that year. He brought with him from Montana ten men, one of whom, George Millar, is now furnaceman for Grand Forks. Alex. Clunis and Hugh Crosby, shift bosses, and Albert Benson, furnace man, whom he brought over from Nelson with him are still on the job. At that time Paul Johnson was smelter superintendent. H. E. Croasdaile, financial manager, and M. S. Davys, mine superintendent at the Silver King mine, near Nelson."

From the Weekly Star, Whitehorse, Southern Yukon, it is learned that one day last month there arrived in Whitehorse by special train, Messrs W. H. Aldridge and Henry Krump, mining engineers of New York City, and Mr. John M. Turnbull, of Vancouver, B.C. The party had been to Taku arm, Atlin mining division, to examine the Engineer gold-quartz mine, the property of Capt. John Alexander, for the purchase of which Eastern capitalists, whom the engineers above-mentioned represented, are now negotiating. The party was accompanied here by Mr. H. McNeill, a prominent lawyer.

A meeting of the Council of the Canadian Mining Institute was held in Montreal on Oct. 5.

Dr. W. G. Miller has returned to Toronto after examining new goldfields in Northern Ontario. He is now in St. Louis attending a meeting of the A. I. M. E.

Mr. J. B. Tyrrell is in Newfoundland. He is expected to return to Toronto about Oct. 20.

Major Neil "Foghorn" Macdonald was the guest of honor at a meeting of the Montreal branch of the Canadian Mining Institute on Oct. 5.

### YUKON NEWS.

Mr. R. O. Ebbert, of Dawson, Yukon Territory, when in Seattle, Washington, last month, said that prosperity elsewhere and the high price of materials are causing a slight abatement of industrial enterprises in Yukon and Alaska.

"I have tried to get away four times myself," said Mr. Ebbert, "but always have returned. This time I hope never to return to the North. The country around Dawson, where I was located, seems to have seen its best days."

Mr. Ebbert is an electrical engineer and was in the employ of the Canadian Klondike Mining Company, which operates four gold dredges near Dawson. Three of these dredges are the largest in the world. Mr. Ebbert said, and last winter was the first that one was ever kept operating anywhere at such low temperature. This winter, Mr. Ebbert said, none of the dredges will be operated.

### GOOD DEMAND FOR GRAPHITE.

The Plumbago Syndicate which took over the properties of the Dominion Graphite Co. at Buckingham, Quebec, is making regular shipments. Flake graphite for crucibles is in great demand.



## SPECIAL CORRESPONDENCE

## BRITISH COLUMBIA.

Quarterly dividends have been declared by several companies operating metalliferous mines in British Columbia. The Consolidated Mining and Smelting Company of Canada, Ltd., has declared a  $2\frac{1}{2}$  per cent. dividend, payable October 1st, total amount, \$210,695; the Granby Consolidated M. S. & P. Co. will pay a dividend of \$2.50 a share on November 1st, total amount, \$374,963. The Hedley Gold Mining Co.'s quarterly dividend and bonus, together at the rate of 20 per cent. per annum, total \$60,000, and the Standard Silver-Lead Mining Co.'s dividend, totalling \$100,000 were payable on October 1st.

Ore receipts at Trail, West Kootenay, show an appreciably large increase. The figures for the last part of September are not yet available, but for three weeks ended September 21st, the total was 28,739 tons, as compared with 24,052 tons for the corresponding period of August and 11,665 tons for that of July.

## West Kootenay.

West Kootenay mines shipped 14,112 tons of ore and concentrates to the smeltery at Trail during three weeks ended September 21st. The proportions from the several divisions were: Ainsworth, 1,168 tons; Slocan, 1,849 tons; Nelson, 375 tons; Rossland, 10,720 tons. This increased output of ore indicates a return toward normal conditions now that more coke is being received at the smelting works. The greater part of the gain was made by Rossland mines, from which little ore was shipped during the period of suspension of operation of the copper furnaces at Trail. Apart from production and shipment of ore there is development activity in different parts of this district which gives promise of increasing the output of ore ere long. In Ainsworth and Slocan divisions especially is this the case, and in comparatively small degree in other parts.

**Slocan.**—During 52 days ended September 21st, Slocan mines shipped to the Consolidated Mining and Smelting Co.'s smeltery at Trail, 4,590 tons of ore and concentrate, chiefly silver-lead. Those situated in the neighborhood of Slocan lake that were among the shippers, namely the Galena Farm, Hewitt, Lucky Thought, Standard and Van Roi, sent out a total of a little more than 1,900 tons, about one-half of which was from the Standard mine. Each of these Slocan like mines, with the exception of the Lucky Thought, has its own concentrating plant, so it is probable the greater part of the product shipped from those mines was concentrate. The other Slocan shippers were the Queen Bess, above Alamo; the Noonday, Slocan Star and Surprise, in the Sandon region; and the Lucky Jim and Rambler-Cariboo, in the eastern part of the Slocan division.

The net earnings of the Slocan Star Mines, Ltd., in August, were about \$4,500, according to a published preliminary estimate stated to be based on reports received from the Slocan Star mine, which amount is about the same as that reported for July, in which latter month the company's operations were replaced on an earning basis. Up to September 14th shipments in that month had been 110 tons of zinc concentrate and 40 tons of lead. The zinc is valued at \$25 to \$31 to the ton. The lead product was of higher grade than the last lot on which settlement was made, which lot contained 46 per cent. lead and 56 oz. of silver to the ton. The carload shipped in the early part of Septem-

ber assayed about 100 oz. of silver to the ton and 60 per cent. lead. On September 18th, Northwest Mining Truth, Spokane, stated that a telegram received from the mine superintendent read as follows: "No. 8 level looks favorable to-day. Are now sorting clean ore from this level. No. 10 level still looking favorable. Are opening good large body of zinc ore above No. 3 level. General outlook very favorable."

**Rossland.**—Mr. Ernest Levy, who for some years has been in charge of the Josie group of mines, owned by the Le Roi No. 2, Ltd., of London, England, was reported recently to have given a representative of a Spokane, Washington, newspaper, the following information: "The Le Roi No. 2, Ltd., at Rossland, B.C., has resumed shipment of ore from its Josie group of mines to the smeltery at Trail after an interruption of several months. The smeltery at Ladysmith, Vancouver Island, received much of the product of those mines up to the time of the change several weeks ago. We have been shipping 1,200 to 1,500 tons a month, and that quantity may be exceeded in September. Last year the average value of the ore shipped was \$22 a ton. We expect that before long we shall again be employing the full number of men at the company's four properties."

The newspaper quoted from stated further that: "The average metal contents of ore from the Le Roi No. 2 company's mines in thirteen years was 0.8142 oz. of gold, 1.0627 oz. of silver, and 39.08 lb. of copper to the ton, so it is gathered from the company's reports. The ore milled, after sorting out the better ore for shipping crude, averaged 0.11 oz. of gold, a little silver, and 0.5 per cent. copper. The recent increase in the price of silver has added about 40 cents a ton to the value of the ore." It may be stated, further, that during its fiscal year ended September 30th, 1916, the Le Roi No. 2, Ltd., produced 7,297 oz. of gold, 17,745 oz. of silver, and 732,631 lb. of copper. The production figures for the fiscal year just ended will not be made public until after the company's annual general meeting shall be held in London several months hence.

## Coast.

After having been in operation about five weeks, the copper smeltery at Ladysmith, Vancouver island, is again inactive, the reason being that there is not at the present time sufficient ore obtainable to allow of the furnaces, or even a single furnace, being kept in blast. This is greatly to be regretted, for it had been expected that with the re-establishment of a custom ore smelting works on the British Columbia coast there would be a number of small mines worked, and that these would maintain an output large enough to keep the smelting works in operation. It is now plainly evident that there is nothing like enough ore obtainable for this to be done. Not that there is not a considerable quantity of ore being produced, but that all the larger producers had made contracts for the smelting of their ores elsewhere before the Ladysmith smeltery was reopened, and, indeed, before negotiations were commenced that eventually led to a resumption of smelting at Ladysmith.

In this connection, it may be mentioned that two mining properties from which a fair amount of ore had been expected are not continuing production owing to returns from ore shipped having proved disappointing. It may be that under experienced supervision a less discouraging result might be obtained, but for the present the position is that ore was shipped and it proved to be of a lower average grade than had been expected.



and consequently the problem of making the mines pay their way has to be faced and solved if production is to be resumed and kept up.

On the other hand, there are two properties, one near Cowichan lake and the other in the Sooke district, southwest of Victoria, that have been proved to have ore of a good enough grade to pay for operation if transportation costs can be kept down. This seems to be practicable in the case of the Sooke property, but the Cowichan Lake property is not so fortunately situated, so that until its transportation difficulties shall have been overcome it is hardly likely to be a regular shipper of any considerable quantity of ore to Ladysmith.

Newspapers have printed reports to the effect that the new mill erected and equipped by the Belmont-Canadian Mines Company at Surf Inlet, Princess Royal Island, is now being operated, but no authenticated particulars have been received. Another report is that a 50-ton concentrating plant is to be put in at the Bowena copper mine, on Bowen island, Howe sound, Vancouver mining division, but since the same publication prints the pure fiction that "the Ladysmith smelter will be enlarged at once at a cost of \$2,000,000....and the extensions will increase the capacity to 1,200 tons a day," and this at a time when even 100 tons of ore a day is not regularly obtainable, all the British Columbia mining news from that source may well be regarded with suspicion. However, there seems to be a lull for the time in the newspaper establishment of iron and steel manufacturing works near Vancouver, which is something to be thankful for, though there may be another outbreak of this malady at any time. Meanwhile there is not any considerable quantity of iron ore being mined in British Columbia.

#### General Notes.

The attention of the authorities has been called in print to an advertisement, appearing in a Vancouver newspaper, of The Business Development Co., Limited, Agents for the River Gold Recovery Co., Limited (non-personal liability). The advertisement is headed "Who Is This Man?" and then allegations are made relative to a man stated to have come from Australia and to a gold recovery process he is announced to be introducing. One allegation in the advertisement is that "by acting immediately you can secure \$5 for every dollar invested." Another allegation is contained in the following sentence: "Remember the Minister of Mines, in an official statement, estimates the value of the gold-bearing river areas of this Province at a billion dollars." Incidentally, the correspondent of The Canadian Mining Journal, while he does not deny that such a statement was ever made or published officially, does state that he never before read or heard of it.

#### ASBESTOS.

The production of asbestos in Canada during 1916 and the first half of 1917, according to returns received by the Mines Branch, Department of Mines, Ottawa, is shown in the following table:

	Tons.	Value.	Per Ton.
Crude.....	2,086	\$1,069,761	\$512.77
Milled fibre .....	62,675	1,999,994	31.91
Total .....	64,761	\$3,069,755	\$47.40
Asbestic. ....	8,442	21,820	2.58

#### THE QUESNEL FORKS COMPANY WINS IMPORTANT CASE.

Victoria, Sept.13.—The Quesnel Forks Gold Mining Company, controlled by Mr. John Hopp and others, was given judgment in the supreme court yesterday by Mr. Justice Macdonald against Robert T. Ward and the Cariboo Mining Company, the action being brought to establish the plaintiff's right of ownership to certain mining property in the Cariboo district. The trial lasted seven days, two of which were taken up in legal argument. His Lordship's judgment taking one hour to dictate.

#### History of the Case.

According to the evidence, the history of the case has been given as follows: In the year 1894 the Canadian Hydraulic Mining Company was owner of certain placer mining leases and Chinese placer claims, which now form the property known as the Bullion Mines. At that time there was no provision in the Mining Act by which these holdings could be consolidated, that is, under which authority could be given to do on any portion of this property all the work required to be done on each particular lease or claim.

As the company wanted to consolidate and operate the properties as one, it went to the Legislature to ask that its holdings be consolidated. This was done and a lease was issued to the company covering the whole of the ground which is owned and also authorizing the issue of a lease for some other ground adjoining these holdings.

The Cariboo Hydraulic Mining Company obtained from the Gold Commissioner the lease authorized by the act of 1894, and in the following year went back to the Legislature and had the lease confirmed, or made a statutory lease. This lease, amongst other things, provided that "if the Cariboo Hydraulic Mining Company or its assigns, should cease, for the space of two years, to carry on mining operations upon such premises or fail to do any work which would conduce to the facilitating of the carrying on of such work as aforesaid, or should completely abandon such premises for the space of one year, then the lease should become absolutely forfeited, and the terms thereby created and all rights, privileges and authorities thereby granted and conferred or intended so to be, should, ipso facto, at the expiration of the times aforesaid, cease and be void as if the said lease had never been made.

At the time the Cariboo Hydraulic Mining Company obtained this lease, in order to hold its mining property, it had to have a free miner's certificate. In or about 1896 the Cariboo Hydraulic Mining Company appeared to have assigned its rights under this lease to the Cariboo Gold Mining Company. The property was then worked until 1907, by which time the Cariboo Gold Mining Company became convinced that the property could not be worked at a profit and at the end of 1907 it sold out practically all its mining equipment and closed down the mine.

Mr. Hobson, who had been the manager of the Cariboo Gold Mining Company, thought that the mine could be worked at a profit, however, and so he appears to have staked it on the supposition that the Cariboo Gold Mining Company had abandoned the property. The latter company, however, got out an injunction and prevented him from carrying in operations after the close of the season of 1908.

After 1908 absolutely nothing was done on the property in the way of mining until 1914. One of the terms of the lease was that the company should do at

least \$5,000 worth of work each year. Before 1907 this provision had been duly complied with. In 1908 an arrangement was made by which it would seem that the Minister of Mines agreed that the company should be given credit for the work it had done before 1907, in excess of the statutory requirements and that this excess should be applied in satisfaction of work required for the years 1908 to 1912.

#### Hopp Locates Claims.

In November, 1913, the property was located by John Hopp and others as being vacant Crown land. Mr. Ward, one of the defendants, claimed that he had agreed to purchase the property from the company in October, before the staking by Hopp. It appeared, however, that as soon as he became aware of the possibility of the Cariboo Gold Mining Company having no title to the land, he entered into a new arrangement with that company under which the price he was willing to give before was cut in two and he assumed the risk of the Cariboo Gold Mining Company having no title to the property.

On May 31, 1912, the Cariboo Gold Mining Company failed to pay its rentals and also failed to take out a free miner's certificate. The fact of failing to take out a free miner's certificate was claimed to cause and absolute and immediate forfeiture of the mining property to the Crown.

In answer to Ward's contention that he owned the property as an assignee of the Cariboo Gold Mining Co., Hopp contended that the Cariboo Gold Mining Co. had nothing whatever to give Ward, as all its rights in the property had become forfeited to the Crown in 1910 on account of the failure of the company for those two years, and the succeeding years, to carry on mining operations. Hopp also contended that the Cariboo Gold Mining Co. in 1912 forfeited all its mining property on account of its failure to take out a free miner's certificate.

#### U. S. SOLDIERS AND SAILORS RELIEVED FROM NECESSITY OF PERFORMING ASSESSMENT WORK ON MINING CLAIMS.

Officers and men who have entered the military service of the United States may hold mining claims without complying with the section of the law which provides that \$100 worth of work shall be performed, annually, upon each unpatented claim. This step was taken by Congress and approved by the President, as a war measure, the text of the resolution reading as follows:

"Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, that the provisions of section twenty-three hundred and twenty-four of the Revised Statutes of the United States, which require that on each mining claim located after the tenth day of May, eighteen hundred and seventy-two, and until patent has been issued therefor, not less than \$100 worth of labor shall be performed or improvements made during each year, shall not apply to claims or parts of claims owned by officers or enlisted men who have been or may, during the present war with Germany, be mustered into the military or naval service of the United States to serve during their enlistment in the war with Germany so that no mining claim or any part thereof owned by such person which has been regularly located and recorded shall be subject to forfeiture for non-performance of the annual assessments during the period of his service or until six months after such owner is mustered out of the service or until six months after

his death in the service: Provided, That the claimant of any mining location, in order to obtain the benefits of this resolution, shall file, or cause to be filed, a notice in the office where the location notice or certificate is recorded, before the expiration of the assessment year during which he is so mustered, giving notice of his muster into the service of the United States and of his desire to hold said mining claim under this resolution."

#### MINING AT WHITEHORSE, YUKON.

On September 21st the Weekly Star printed the following news of mining in Whitehorse, Copper camp, in Southern Yukon:

Last week the crew of the government diamond drill, now working at the Valerie mine, went down 105 feet at a point a few feet west of the pumping station and struck a considerable body of ore. The drill was then removed about 50 feet southeastward and a new hole was then started. At a depth of 50 feet a body of high grade ore nine feet thick was passed through. There are night and day shifts on the drill.

John Warne is at the Valerie getting out timbers for anew pumping station that is to be put in there shortly.

A carload of the finest looking copper ore ever mined in this district is being hauled to town from the Rabbit's Foot mine and put on the car for shipment to an outside smelter.

### :-: Markets :-:

#### SILVER PRICES.

		New York. cents.	London pence.
September	24.....	108 <sup>1</sup> / <sub>2</sub>	55
"	26.....	106 <sup>1</sup> / <sub>2</sub>	54
"	25.....	108 <sup>1</sup> / <sub>2</sub>	55
"	27.....	101 <sup>5</sup> / <sub>8</sub>	51 <sup>1</sup> / <sub>2</sub>
"	28.....	97 <sup>5</sup> / <sub>8</sub>	49 <sup>1</sup> / <sub>2</sub>
"	29.....	96 <sup>5</sup> / <sub>8</sub>	49
October	1.....	95 <sup>1</sup> / <sub>2</sub>	48 <sup>1</sup> / <sub>2</sub>
"	2.....	93 <sup>5</sup> / <sub>8</sub>	47 <sup>1</sup> / <sub>2</sub>
"	3.....	93 <sup>5</sup> / <sub>8</sub>	47 <sup>1</sup> / <sub>2</sub>
"	4.....	92 <sup>1</sup> / <sub>8</sub>	46 <sup>3</sup> / <sub>4</sub>
"	5.....	91 <sup>1</sup> / <sub>8</sub>	46 <sup>1</sup> / <sub>4</sub>
"	6.....	90 <sup>5</sup> / <sub>8</sub>	46
"	8.....	90 <sup>1</sup> / <sub>8</sub>	45 <sup>3</sup> / <sub>4</sub>

#### TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.
Cobalt oxide, grey, \$1.65 per lb.
Cobalt metal, \$2.25 per lb.
Nickel metal, 45 to 50 cents per lb.
White arsenic, 15 cents per lb.
Oct 11, 1917—(Quotations from Canada Metal Co., Toronto)
Spelter, 10 <sup>1</sup> / <sub>2</sub> cents per lb.
Lead, 10 <sup>1</sup> / <sub>2</sub> cents per lb.
Tin, 63 cents per lb.
Antimony, 18 cents per lb.
Copper, casting, 32 cents per lb.
Electrolytic, 33 cents per lb.
Ingot brass, yellow, 20 cents, red, 25 <sup>1</sup> / <sub>2</sub> cents per lb.
Oct 11, 1917—(Quotations from Elias Rogers Co., Toronto)
Coal, anthracite, \$9.50 per ton
Coal, bituminous, nominal, \$9.00 per ton



## STANDARD STOCK AND MINING EXCHANGE.

(Courtesy of J. P. Bickell &amp; Co.)

Closing prices, October 9th, 1917.

Gold.		Bid	Ask
Apex. . . . .		.07 $\frac{3}{4}$	.08
Dome Extension . . . . .		.11 $\frac{1}{2}$	.11 $\frac{3}{4}$
Dome Lake . . . . .		.15 $\frac{1}{2}$	.16 $\frac{1}{2}$
Dome Mines . . . . .		8.00	8.20
Foley O'Brien . . . . .		.....	.55
Imperial. . . . .		.01 $\frac{7}{8}$	.02
McIntyre. . . . .		1.40	1.41
New Holly . . . . .		5.20	5.25
New Ray . . . . .		.55	.58
Porcupine Crown . . . . .		.....	.42
Porcupine Vipond . . . . .		.25	.....
Preston East Dome . . . . .		.03 $\frac{1}{2}$	.04
Teck-Hughes. . . . .		.43	.45
West Dome . . . . .		.16 $\frac{1}{2}$	.16 $\frac{3}{4}$

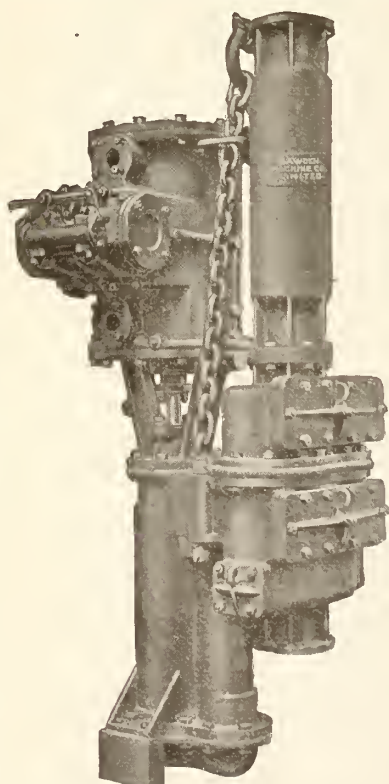
Silver.		Bid	Ask
Adanac. . . . .		.15 $\frac{1}{2}$	.15 $\frac{3}{4}$
Bailey . . . . .		.04	.05
Beaver . . . . .		.37	.38
Chambers Ferland . . . . .		.12	.13
Coniagas . . . . .		...	4.00
Crown Reserve . . . . .		.24	.25
Gifford . . . . .		.04 $\frac{1}{2}$	.04 $\frac{7}{8}$
Great Northern . . . . .		.05 $\frac{1}{2}$	.06
Hargraves . . . . .		.10	.10 $\frac{1}{4}$

Hudson Bay . . . . .	...	40.00
Kerr Lake . . . . .	5.30	5.55
La Rose . . . . .	.43	.45
McKinley . . . . .	.60	.61 $\frac{1}{2}$
Nipissing . . . . .	8.00	8.05
Peterson Lake . . . . .	.09 $\frac{3}{4}$	.10
Right of Way . . . . .	.05	.05 $\frac{1}{2}$
Seneca Superior . . . . .	.02	.02 $\frac{1}{2}$
Silver Leaf . . . . .	.01	.02
Temiskaming . . . . .	.30	.30 $\frac{1}{2}$
Trethewey . . . . .	.14	.14 $\frac{1}{2}$
Wetlaufer. . . . .	.05	.07
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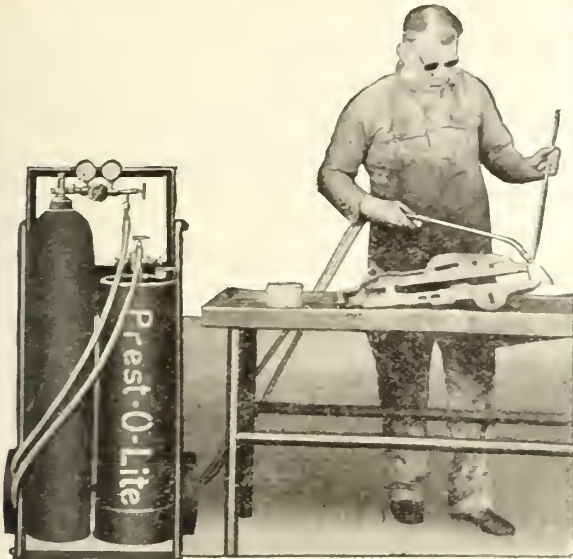
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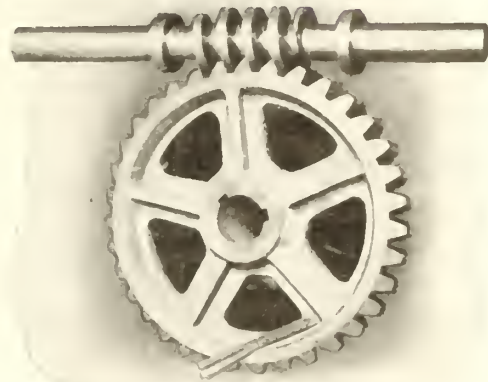


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#### Recent Publications

- The Nickel Industry: with special reference to the Sudbury region, Ont. Report on, by Professor A. P. Coleman, Ph.D.
- The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.
- Building and Ornamental Stones of Canada (Western Provinces). Vol IV., by W. A. Parks, Ph.D.
- Feldspar in Canada. Report on, by H. S. de Schmid, M.E.
- Peat, Lignite and Coal: their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.
- Annual Report of Mineral Production during Calendar Year, 1915, by John McLeish, B.A.
- The Petroleum and Natural Gas Resources of Canada: Vols. I. and II., by F. G. Clapp, M.A., and others.
- The Value of Peat Fuel for the Generation of Steam. Bulletin No. 17, by John Blizard, B.Sc.
- Cobalt Alloys with Non-corrosive Properties. Report on, by H. T. Kalmus, B.Sc., Ph.D.
- Electro-thermic Smelting of Iron Ores in Sweden. Report on, by A. Stansfield, D.Sc.
- Non-metallic Minerals Used in Canadian Manufacturing Industries. Report on, by H. Frechette, M.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

**Fuel Testing Laboratory.**—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.

**Ore-Dressing Laboratory.**—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.

**Chemical Laboratory.**—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.

**Ceramic Laboratory.**—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.

**Structural Materials Laboratory.**—Experimental work on sands, cements and limes is also undertaken.

Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

### GEOLOGICAL SURVEY

#### Recent Publications

- Memoir 85. Road Material Surveys in 1914, by L. Reinecke.
- Memoir 87. Geology of a Portion of the Flathead Coal Area, British Columbia, by J. D. Mackenzie.
- Memoir 92. Part of the District of Lake St. John, Quebec, by John A. Dresser.
- Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.
- Memoir 94. Ymir Mining Camp, British Columbia, by Charles Wales Drysdale.
- Memoir 95. Onaping Map-Area, by W. H. Collins.
- Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.
- Memoir 97. Scroggie, Barker, Thistle and Kirkman Creeks, Yukon Territory, by D. D. Cairnes.
- Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.
- Map 57A. Frank, Alberta (showing the landslide of 1903).
- Map 63A. Moncton Sheet, Westmorland and Albert Counties, New Brunswick. Topography.
- Map 151A. Nansen and Victoria Creeks, Nisling River, Yukon Territory.
- Map 152A. Kluane Lake, Yukon Territory.
- Map 154A. Southwestern Yukon.
- Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.
- Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.
- Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.
- Map 166A. Portion of Flathead Coal Area, Kootenay District, B.C. Topography.
- Map 182A. Portion of Flathead Coal Area. Geology.
- Map 186A. Explored Routes between Lake Athabaska and Great Slave Lake on the Tazin, Taltson, Slave and Peace Rivers.
- Map 1667. Slocan Mining Area, Kootenay District, B.C.
- Map 1677. Coleraine Sheet, Megantic and Wolfe Counties, Quebec.

Applicants for publications not listed above should mention the precise area concerning which information is desired.

Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to The Director, Geological Survey, Ottawa.

## To Users of the Callow Pneumatic Flotation Cell

**U**SERS of the Callow Cell are naturally interested in knowing how the decision of the United States Circuit Court of Appeals for the Third District, in the Miami case, will affect their interests.

As we understand the prevailing opinion of Judge Woolley in the Miami case he has interpreted the Supreme Court decision in the Hyde case as meaning that "*invention resides not alone in the critical proportion of oil, but also in air and agitation,*" and again, "*in the co-action of the critical proportion of oil and air effected by 'an agitation greater than, and different from that which had been resorted to before,' resulting in a froth concentrate of economical value,*" and further, that the Supreme Court did not limit the patent to "*agitation by mechanical means,*" but to agitation of a violent and persistent kind; "*it mixes the oil with the metal of the ore. This is old. Then, by its greater intensity and longer duration, it stirs the pulp into a froth.*"

Thus, this decision of the Third Circuit Court of Appeals has a most important bearing upon the art, because it holds that the mixing of the oil with the mineral is old, but it **leaves open the use of oil in connection with aeration-cells.** Meanwhile the idea of a "*critical*" proportion of oil has been dis-

proved by practice in several mills within a short time after it was promulgated.

Judge Woolley says further, concerning the Callow Cell: "*Aeration is direct, and is not the result of or caused by agitation. On the contrary, agitation results from aeration and such agitation, though present in some measure, is not even approximately of the violence and duration of the agitation of the patent. The operation in the Callow Cell certainly possesses these distinguishing features from operation of the process where aeration is caused by agitation.*"

The Court further confirms this important dictum by saying: "*If the only agitation to which the pulp was subjected (after such agitation as in the prior art was necessary to mix the oil and ore) was the agitation of the Callow Cells, we would not say that that agitation amounted to or was the equivalent of the violent agitation of the patent disclosure and constituted infringement.*"

Apparently users of the Callow Cell may feel assured they do not infringe the method of agitation described in U.S. Patent No. 835,120 (less than 1% oil), No. 962,678 (soluble frothing agents), No. 1,099,699 (phenol or cresol in the cold without acid) since all three of the patents are of the same process, dependent upon a certain degree of violence and length of agitation and the production of the same characteristic froth, as set forth in their claims.

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<b>Pipe Fittings—</b> Can. Fairbanks-Morse Co. Northern Canada Supply Co.	<b>Pumps—Pneumatic—</b> Can. Fairbanks-Morse Co. Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd. Sullivan Machinery Co.	<b>Samplers—</b> C. L. Constant Co. Ledoux & Co. Milton Hersey Co. Thos. Heys & Son.	<b>Steel—Tool—</b> N. S. Steel & Coal Co. Armstrong, Whitworth of Can., Ltd.
<b>Piston Rock Drills—</b> Mussens, Limited.	<b>Pumps—Steam—</b> Can. Fairbanks-Morse Co. Can. Ingersoll-Rand Co., Ltd. Mussens, Limited. Northern Canada Supply Co. Jenckes Machine Co.	<b>Scales—</b> Can. Fairbanks-Morse Co.	<b>Surveying Instruments—</b> W. F. Stanley. C. L. Berger.
<b>Pneumatic Tools—</b> Can. Ingersoll-Rand Co., Ltd. Jones & Glasco. Jenckes Machine Co.	<b>Pumps—Turbine—</b> Can. Fairbanks-Morse Co. Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd. ada, Limited.	<b>Screens—</b> Jeffrey Mfg. Co. Northern Canada Supply Co. Hendrick Mfg. Co.	<b>Tanks—Cyanide, Etc.—</b> Hendrick Mfg. Co. Pacific Coast Pipe Co., Ltd. MacKinnon, Holmes & Co.
<b>Prospecting Mills and Machinery—</b> Standard Diamond Drill Co.	<b>Pumps—Vacuum—</b> Can. Fairbanks-Morse Co. Smart-Turner Machine Co.	<b>Screens—Cross Patent Flanged Lip—</b> Hendrick Mfg. Co.	<b>Transits—</b> C. L. Berger & Sons.
<b>Pulleys, Shafting and Hangers—</b> Can. Fairbanks-Morse Co. Jeffrey Mfg. Co. Northern Canada Supply Co.	<b>Quarrying Machinery—</b> Sullivan Machinery Co. Can. Ingersoll-Rand Co., Ltd. Jenckes Machine Co.	<b>Separators—</b> Can. Fairbanks-Morse Co. Smart-Turner Machine Co.	<b>Turbines—</b> Escher Wyss & Co.
<b>Pumps—Boiler Feed—</b> Can. Fairbanks-Morse Co. Smart-Turner Machine Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd. Wettlaufer Bros.	<b>Roofing—</b> Can. Fairbanks-Morse Co. Northern Canada Supply Co.	<b>Sheet Lead—</b> Canada Metal Co., Ltd.	<b>Twist Drills—High Speed—</b> Can. B. K. Morton Co.
<b>Pumps—Centrifugal—</b> Can. Fairbanks-Morse Co. Escher Wyss & Co. Mussens, Limited. Smart-Turner Machine Co. M. Beatty & Sons. Can. Ingersoll-Rand Co., Ltd.	<b>Rope—Manilla and Jute—</b> Jones & Glasco. Northern Canada Supply Co. Allan, Whyte & Co.	<b>Sheets—Genuine Manganese Bronze—</b> Hendrick Mfg. Co.	<b>Valves—</b> Can. Fairbanks-Morse Co.
	<b>Rope—Wire—</b> Allan, Whyte & Co. Northern Canada Supply Co. Can. B. K. Morton	<b>Shovels—Steam—</b> M. Beatty & Sons.	<b>Winding Engines—Steam &amp; Electric—</b> Can. Ingersoll-Rand Co., Ltd. Jenckes Machine Co.
		<b>Stacks—Smoke Stacks—</b> Can. Fairbanks-Morse Co. Hendrick Mfg. Co. MacKinnon, Holmes & Co.	<b>Wire Cloth—</b> Northern Canada Supply Co. B. Greening Wire Co., Ltd.
		<b>Steel Barrels—</b> Smart-Turner Machine Co.	<b>Wire (Bare and Insulated)—</b> Standard Underground Cable Co., of Canada, Ltd.
		<b>Steel Drills—</b> Sullivan Machinery Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd. Can. B. K. Morton.	<b>Zinc Spelter—</b> Canada Metal Co., Ltd. Hoyt Metal Co.

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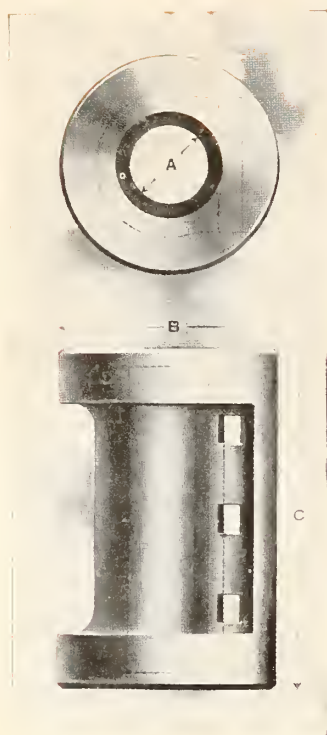
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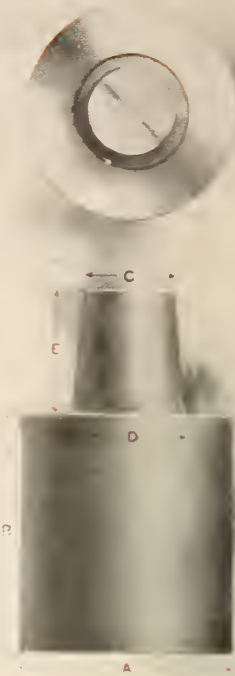
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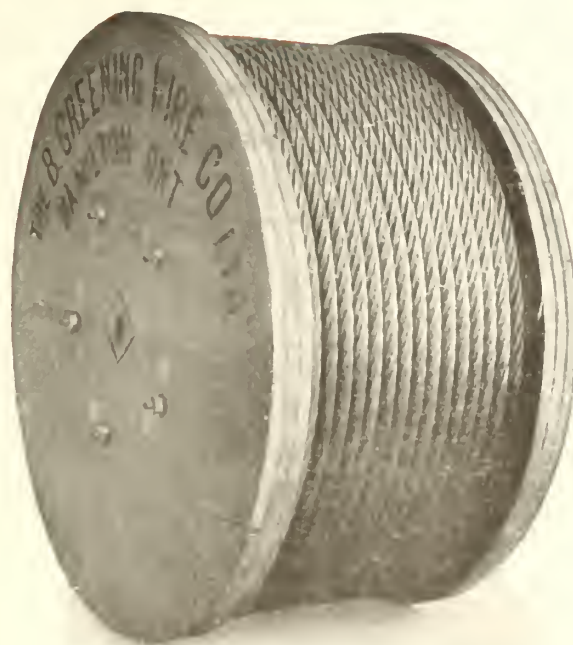
# CANADIAN MINING JOURNAL

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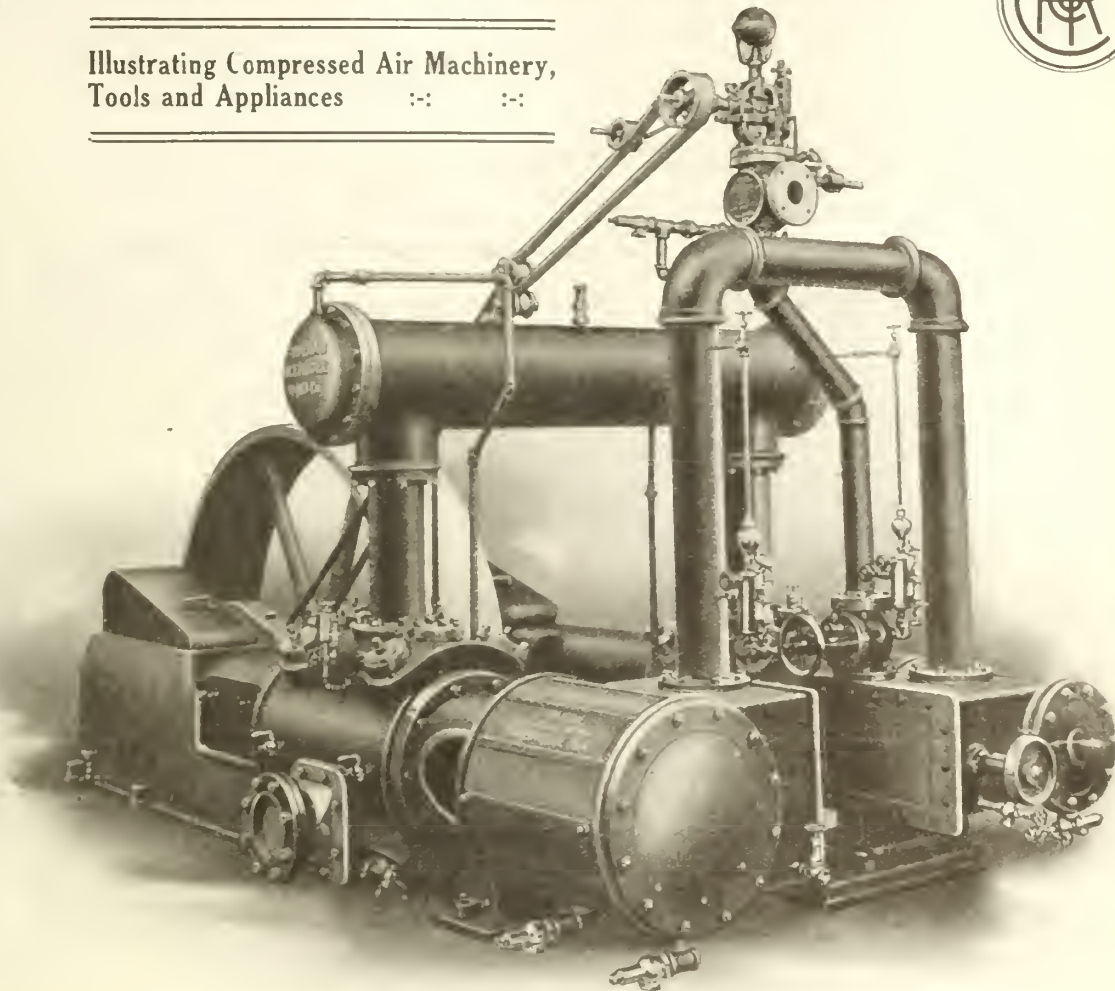
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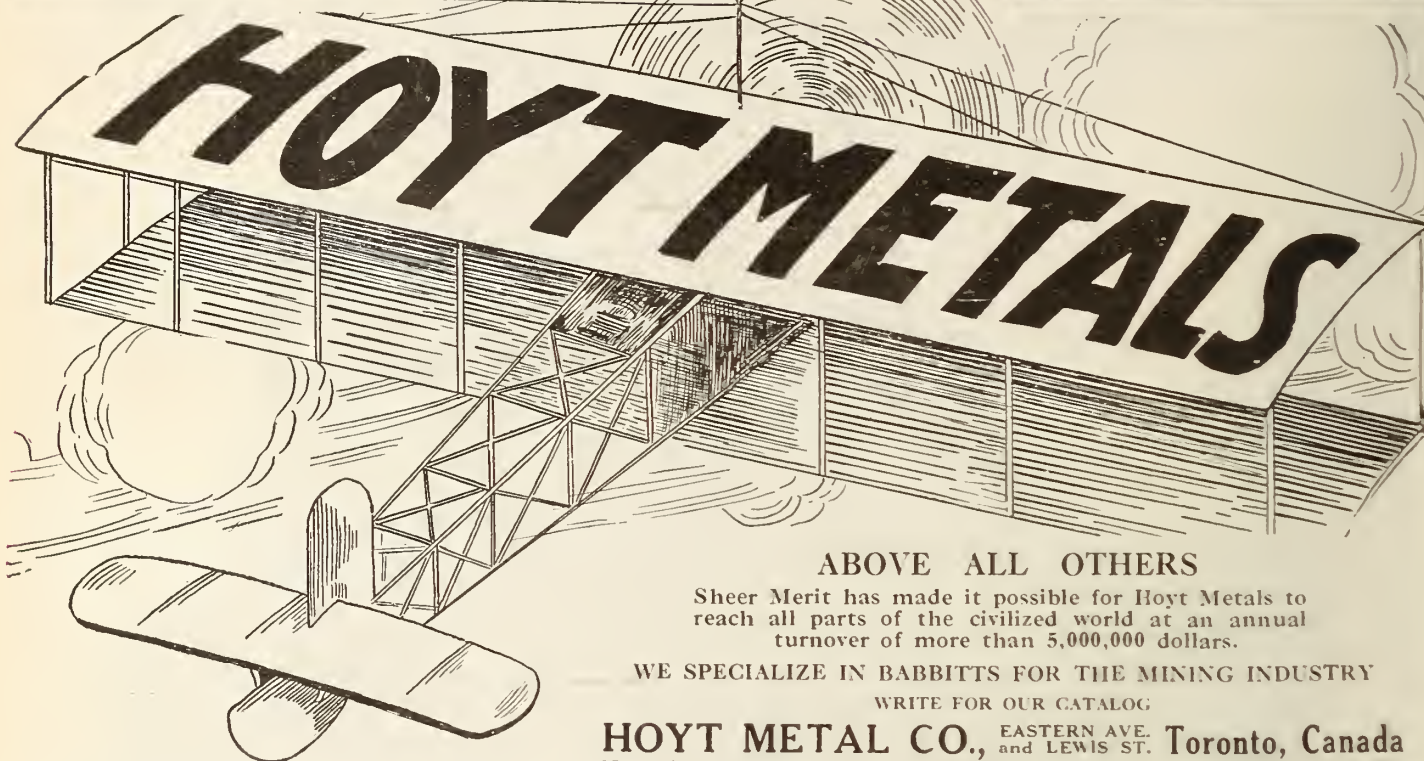
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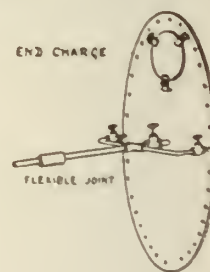
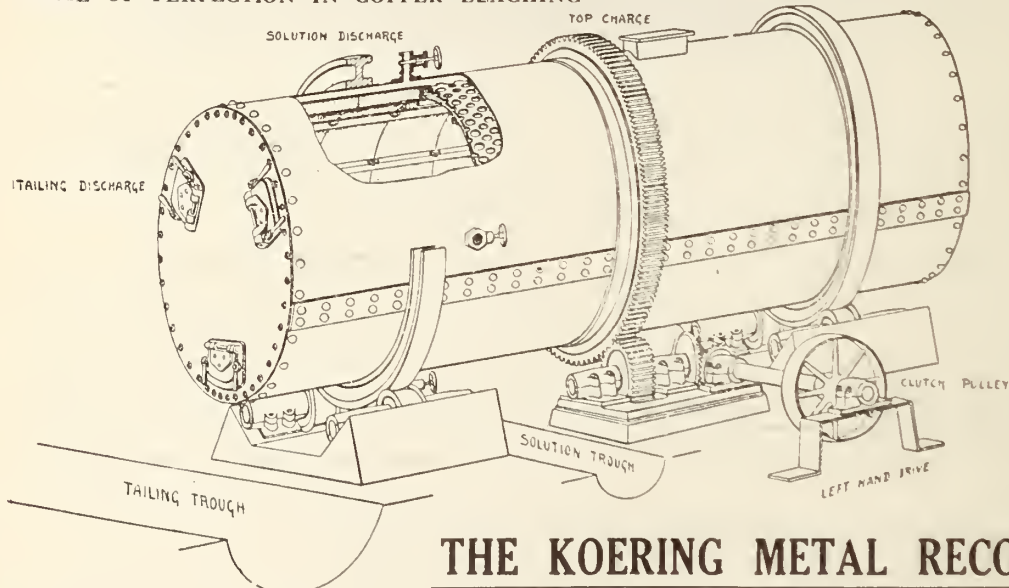
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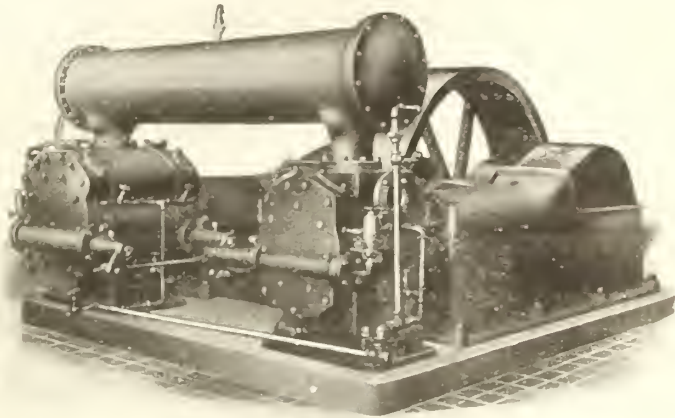
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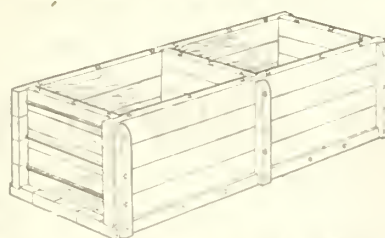
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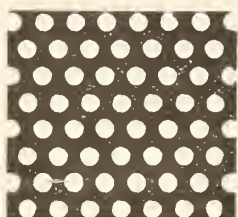
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**Iron** The province contains numerous districts in which occur various varieties of iron ore, practically at tide water and in touch with vast bodies of fluxes. Deposits of particularly high grade manganese ore occur at a number of different locations.

**Gold** Marked development has taken place in this industry the past several years. The gold fields of the province cover an area approximately 3,500 square miles. The gold is free milling and is from 870 to 970 fine.

**Gypsum** Enormous beds of gypsum of a very pure quality and frequently 100 feet thickness, are situated at the water's edge.

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Prospecting and Mining Rights are granted direct from the Crown on very favorable terms.

Copies of the Mining Law, Mines Reports, Maps and Other Literature may be had free on application to

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*Commissioner of Public Works and Mines*



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### MINES BRANCH

#### Department of Colonization, Mines and Fisheries

*The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, etc.*

The Mining Law gives absolute security of Title and is very favourable to the Prospector.

**MINERS' CERTIFICATES.** First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

**WORKING CONDITIONS.** During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

**SIX MONTHS AFTER STAKING.** At the expiration of six months from date of the staking, the prospector, to retain his rights, must take out a mining license.

**MINING LICENSE.** The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

**MINING CONCESSION.** Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

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The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

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MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC.**

# The Flotation Process

All patent and other rights to this process  
in North America are now controlled by

## Minerals Separation North American Corporation

who is the registered owner of the following Canadian patents: Nos. 76,621; 87,700; 94,332; 94,516; 94,718; 96,182; 96,183; 99,743; 127,397; 129,819; 129,820; 134,271; 135,089; 137,404; 142,607; 147,431; 147,432; 148,275; 151,479; 151,480; 151,619; 151,810; 157,488; 157,603; 157,604; 160,692; 160,693; 160,694; 160,846; 160,847; 160,848; 160,849; 160,850; 160,937; 163,587; 163,608; 163,707; 163,936; 165,390; 166,415; 167,474; 167,475; 167,476; 167,603.

On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

## NOTICE

Notice is hereby given that we will enforce our patents and stop all infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

Notice is further given that no one is authorized to introduce our processes or apparatus into the United States, Canada or Mexico.

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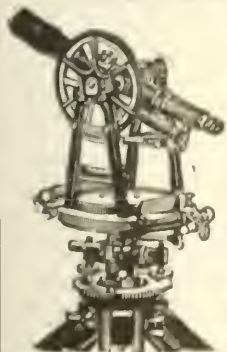
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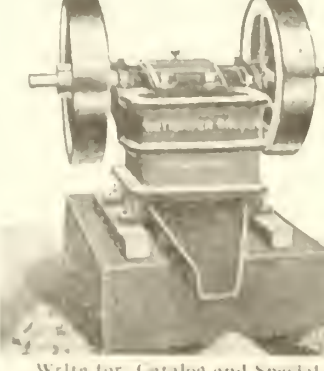
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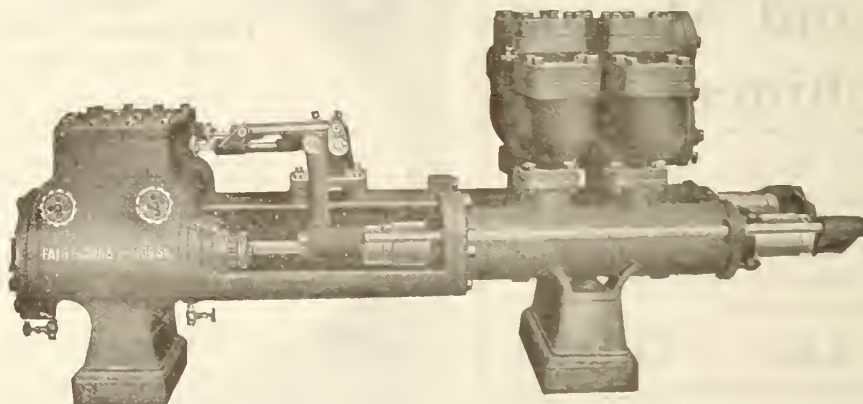
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# THE CANADIAN MINING JOURNAL

VOL. XXXVIII.

TORONTO, November 1st, 1917.

No. 21

## The Canadian Mining Journal

With which is incorporated the  
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada.

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**MINES PUBLISHING CO., LIMITED**

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Editor: REGINALD E. HORE, B.A. (Toronto).

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In its issue of October 20th the "Northern Miner" reprints several articles on the Minerals Separation corporations from "Mining and Scientific Press." These articles were read with much interest by those who desire to keep posted on flotation matters and the reprinting of them at this time in a Canadian paper should help to explain why mining men are always ready to fight the M. S. corporations. For unmitigated nerve there are few documents that class with the M. S. license.

## THE RETURNED SOLDIER.

The problem of the returned soldier is one that must receive the best attention of those who, for one reason or another, have not shared in the stern work on the battlefields of Europe. These men fought for us. What are we doing and what can we do for them?

Already several thousand men, unfit for further work in the trenches, have been returned to Canada. A large percentage of these men will be able, and will wish, to resume their former occupations. Others are unable, and some unwilling, to take up their old tasks. The Military Hospitals Commission will doubtless be pleased to receive suggestions as to what should be done for these men.

The Commission has already accomplished much. Hospital accommodation in all parts of the country has been provided for, and the returned men are being cared for in the districts where they enlisted. Recently, the organization of the work of training the men while convalescent, and the providing for industrial re-education of those who want it, has been taken charge of by Mr. W. E. Segsworth, a Toronto mining engineer who is now devoting his well known abilities entirely to this work. With the co-operation of such men as Mr. F. H. Sexton, in the Maritime Provinces, and Mr. H. E. T. Hantain in Ontario, the Administrator of Vocational Training has begun his work in a manner which will meet with the approval of the mining profession. Mr. Segsworth is persistency personified. He is out to get a square deal for returned men and he'll get it.

In this issue we publish an article, by Mr. H. M. Lamb, on the desirability of encouraging some of the returned soldiers to become prospectors. The suggestion is one which should be discussed. Obviously it would be a mistake to expect that many of the men who have already returned, will take up the prospector's work. These men have weakened constitutions. Their unfitness for further work in the trenches is an indication that the rough life of the prospector is not for them. There are exceptions, but we cannot fairly depend on disabled men for the pioneer work.

When the war is over, however, there will be many men among those who return who will be physically in splendid shape to undertake prospecting. Many of these men will be so "fed up" with trench life that camp life will have no attraction for them. Others who rather like the rough life will be not content with the loneliness of our northern forests, they will want to live where they will have many companions at work and play. There will fortunately be among the re-



turned men, some who intend to search for minerals and others who might be persuaded to do so. To these we might well offer some inducements.

Mr. Lamb's suggestion, if carried out, would be a step towards the organized prospecting of the most promising parts of Canada. Provision would be made for training the men, for directing their efforts and for giving them financial assistance. It is a bold scheme that appeals to us, in spite of the difficulties that appear likely to be encountered in carrying it out.

The results of exploration in Canada during recent years are living proof that our mineral resources, when developed, will be a great source of revenue to the country. At the rate prospecting is now being carried on, it will be ages before our resources are properly utilized. Here is a chance to reward the returned soldier and at the same time speed up exploration. Why not seize the opportunity? Canada could well afford to be liberal to the returned soldier who is willing to face the hardships of life in the north.



W. E. SEGSWORTH  
Administrator of Vocational Training.

The appointment of a Reconstruction and Development Committee is announced. This is an indication that problems affecting the welfare of the country are to be attacked systematically. The Committee is a strong one and its appointment will be welcomed. The War Cabinet has charge of the most pressing business of the country at present; but this Committee has also very important work to do.

### INVESTIGATE THE MINERALS SEPARATION CORPORATIONS.

A correspondent, referring to the Minerals Separation controversy, says: "I am of the opinion that a thorough investigation of this company and all its antecedents, changes in directorate, stock held in trust, etc., is quite in order." With this opinion we entirely agree.

During the past few years there has been a growing suspicion among mining men in Canada and the United States that there was something rotten about the Minerals Separation activities in North America. For some reason, not yet satisfactorily explained, the American Syndicate continued to do business through Beer, Sondheimer & Co. This firm is, with reason, regarded as an alien enemy firm by Canadian mine managers. The directors of the American Syndicate must surely have been aware of this; but, until December, 1916, they did little towards acquiring for themselves a better odor. At that time a new corporation was formed in America and it was widely advertised that the Minerals Separation North American Corporation had acquired the M. S. rights for North America and that this American corporation had no agents. Strangely enough, at the same time that the New York office was sending out such announcements, the San Francisco branch was sending out letterheads on which it was printed that Beer, Sondheimer & Co. were agents. This, we have been advised, was an error in printing and was corrected as soon as it was noted by the head office, but it is an indication that the San Francisco branch was not, last January, of the opinion that the Beer, Sondheimer & Co. connection had been cut.

It is no secret that there was German influence in the Minerals Separation American Syndicate. Back in 1910 a syndicate formed to acquire an option to purchase within two years the rights of Minerals Separation, Ltd., for North America, and meanwhile to work the patents under license, included Albert Sondheimer, of Frankfurt-a-Main, Germany. In 1913, the Minerals Separation American Syndicate (1913), Ltd., was registered in London and one of the directors was N. M. T. Sondheimer, of Frankfurt.

That Germans should acquire stock in the British corporation is not surprising; but it is strange that a British corporation should, after the outbreak of war with Germany, continue to allow Beer, Sondheimer & Co. to represent it. This and other indications of German influence have led many to wonder whether the Germans put as many German directors on the board as their share ownership entitled them to. It leads us also to wonder who now owns the interest in the Minerals Separation corporations that was owned by the Germans a few years ago. We would like to know the

terms under which this property changed hands. Those who are asked to pay royalties have a right to insist on such matters being properly explained.

The Minerals Separation North American Corporation is an American corporation and under the survey of the American government. To accuse it of being German without first asking the American Government to investigate it, is hardly fair to that Government. We might as well accuse our American friends of being pro-German as accuse them of harboring a German controlled corporation whose object is to curtail production of minerals. The questionable behavior of the M. S. corporation before the United States joined the Allies is no excuse for lack of confidence in Americans now.

There are many reasons why Canadian mining companies should fight the claims of the Minerals Separation corporations. None of these reasons, however, warrants the publication of the charges made by the "Northern Miner" against the American corporation. Neither do they warrant the false charges made by the "Northern Miner" in reference to our part in the controversy.

In its issues of October 13th and October 20th, the "Cobalt Nugget" discusses the flotation patents in a manner that contrasts strongly with the false charges of the "Northern Miner." The "Nugget" presents some reliable information concerning the flotation process and patents and makes a good argument in favor of the companies which wish to use the process.

Owing to the fact that there was such a close connection between Minerals Separation American Syndicate, Ltd., and Beer, Sondheimer & Co., there is reason to ask for an investigation of the connection between these firms and the Minerals Separation North American Corporation. This American corporation is, we believe, entirely free from German control. We have, however, not been informed as to how the German interest was disposed of. We have not been assured that no German benefits in any way from royalties collected by the American corporation. Canadians will undoubtedly refuse to pay any royalty which directly or indirectly benefits a German. As there has been no satisfactory explanation of the disposal of the German interest in Minerals Separation American Syndicate, operators here have every right to ask the Canadian Government for an investigation. They have no right, on any evidence that has yet been presented, to accuse the American corporation of being German, but they can justly ask for some light on the transaction between Minerals Separation corporations and Beer, Sondheimer & Co.

### MINERALS SEPARATION LICENSES.

The "Cobalt Nugget," on October 20th, published the following article on Minerals Separation methods. The claims of the M. S. corporations with regard to discoveries by users of the process seem ridiculous to Canadians and it is unlikely that support for them could be found under our laws. It would be foolish for anyone to subscribe to such a contract as this until it has been proved legal. If it has not been proved legal in Canada, and if the M. S. N. A. corporation insists on such a contract being signed before granting a license then the corporation is in effect refusing to grant licenses. The obvious penalty for such action should be demanded.

The controversy relative to the Minerals Separation North American Corporation has resolved itself largely into two questions, namely: (1) Is there alien-enemy ownership, control or influence in the affairs of the Minerals Separation North American Corporation. (2) Are the terms of royalty demanded excessive and out of proportion to what that corporation has done for making the process the success that it is and an attempt being made to monopolize one entire branch of science.

It is an undeniable fact that not only a few, but a great number of metallurgists have contributed fundamentally toward the successful development of the flotation process. What seems so unreasonable in the whole affair is that Minerals Separation endeavor to claim the rights of any further discoveries or improvements made whether by themselves or any person else. This is in part what they request a licensee to subscribe to: "The licensees shall during this license promptly communicate and explain to the licensors every invention or discovery made or used by them which may be an improvement, modification or addition to any of the inventions specified in the Letters Patent within this license or may be useful in carrying out any of the processes thereby protected or any addition thereto or modification thereof whether patentable or not which the said licensees may use or be or become possessed of. All such inventions and discoveries shall so be available for use by the licensees as if they were contained in the Letters Patent within this license and **subject thereto the licensors shall be entitled to have the full benefit of** and if obtainable to have Letters Patent for any such improvements or discoveries communicated to them by the licensees, which said Letters Patent **shall be and become the property of the licensors**, and the licensees shall render all assistance in their power for that purpose." (See section three of license.)

If this is not a deliberate attempt to monopolize one entire branch of science, for what purpose then was the word 'monopoly' coined? Minerals Separation own certain patents. Other individuals own somewhat similar patents. All have contributed fundamentally toward making the flotation process the success that it is. None have contributed wholly toward doing so. None should be permitted to monopolize a chain of discoveries evolved through years of toil and study by independent workers. In a measure, local enterprise solved the problem of the economic treatment of Cobalt ores. The problem was solved by an adherence to certain principles laid down by Frank Moore, Minerals Separation and presumably many other metallurgists, coupled together with not a few separate and distinct new practical and scientific ideas developed by local ingenuity.



If the Minerals Separation or their subsidiary in America is British or American, it would be nothing short of a crime to annul a solitary right contained in their patents. But, if they elect to interpret liberty as "license" for profiteering, then just as surely as rights exist, they should be called to task and a curb applied. This curb would consist of the fixing of royalty terms by the Canadian Government.

In certain quarters it has been intimated that Minerals Separation North American Corporation affairs were influenced by alien enemies. However, the writer has not sufficient information at hand to support any such charge. But, no doubt those responsible for such charges are sincere, and if what they intimate can be proven to be correct, then there would be no course left open but to annul M.S.N.A. Corporation patents. This latter procedure would be made imperative, due to the fact that Canadian companies would not dare enter into any contract or dealings with such a corporation because of the severe penalties contingent upon "The Trading with the Enemy Act."

It, therefore, is plainly up to the Government. They must decide either that Minerals Separation North American Corporation is truly British and American, or is but a blanket personnel controlled by German influence. If the former, they must decide whether or not the rights conferred upon them in their patents are being paternally applied; but if controlled or influenced in any way by German brains, their patents should be annulled.

The writer has in the past, and will in the present as well as in the future endeavor to be fair to Minerals Separation, and wishes to reiterate the assertion that any question of nationality should be dealt with by the Government.

Our quarrel is against an apparently burdensome monopoly. Anything that tends to impede progress in the mining profession we will oppose. We directly charge Minerals Separation North American Corporation with an apparently deliberate attempt to mortgage the brains of the men who become their licensees. We directly charge that concern with retarding the progress of metallurgy.

Read the following Prussianized section 5 and 6 of the license a licensee or prospective licensee must subscribe to:

(5) The licensees shall not directly or indirectly during the continuance of this license nor at any time after the termination thereof dispute or object to the validity of the Letters Patent within this license or the novelty or utility of the inventions specified therein.

(6) The licensees shall not either directly or indirectly during the continuance of the Letters Patent within this license or any of them use the said inventions or processes or any improvement or modification thereof or addition thereto otherwise than in accordance with these presents, and the licensees hereby undertake and agree that they, their officials and agents, will not in any way directly or indirectly support or assist third or hostile parties in any litigation either against the licensors or any licensees of the licensors or against Minerals Separation, Limited, of London, Eng., or subsidiary or associated companies or successors owning patents in the British Empire or in any foreign countries for the inventions protected by the Letters Patent within this license, or its or their licensees, or by the licensors or said Minerals Separation, Limited, or said other companies, against others."

In other words the fruits of a licensee's intellect are not his own, they are Minerals Separation's, if that concern can enforce the lettering of their license. Surely such a pledge cannot be British. It would be difficult here to measure the embarrassment to which a licensee would be subjected during the future practice of his profession. He would always labor under the possibility of Minerals Separation contending that any stand relating to the subject matter of the agreement and brought forward by the licensee in his subsequent career, was a breach of his pledges. He would be honor bound to not even any time after the termination of the contract be permitted to utter adverse opinion regarding the validity, novelty or utility of the Letters Patent.

Has any set of individuals the Prussianized right to seal the future or muzzle the expanding or changing views of the budding intellect of Canada. Can Minerals Separation get support of the legality of such an attempt in this Dominion. Self respect of mining men of this country forms a barrier to their becoming a party to such a pledge. Self respect of the Government will surely not permit the continuation of the attempt. The discoveries resultant upon the intellect which flows through this particular branch of the channels of science must not be taken into impondage by one set of individuals who, at their own discretion may permit them to become of use to the world or rule that they should stagnate in the pigeon hole of an obscure desk of New York's Broadway.

#### WAR CABINET AND RECONSTRUCTION AND DEVELOPMENT COMMITTEE.

Canada's War Cabinet is announced: also the committee of the Cabinet which will have charge of the domestic problems arising out of the war. The War Cabinet—technically known as the War Committee of the Cabinet Council—will have the Prime Minister as its president and Hon. N. W. Rowell as its vice-president. The other committee, which will be known as the chief reconstruction and development committee, will also have the Prime Minister as its president. Hon. A. K. MacLean, Minister without portfolio, will be vice-president.

The personnel of the two committees is as follows:

War Cabinet: Chairman, Sir Robert Borden; Vice-Chairman, Hon. N. W. Rowell. President of the Privy Council; Major-General Mewburn, Minister of Militia and Defence; Sir Thomas White, Minister of Finance; Hon. C. C. Ballantyne, Minister of Marine and Fisheries and Naval Service; Hon. C. J. Doherty, Minister of Justice; Hon. F. B. Carvell, Minister of Public Works; Hon. A. L. Sifton, Minister of Customs; Hon. P. E. Blondin, Postmaster-General, and Sir Edward Kemp, Minister of Overseas Militia Forces.

Reconstruction and Development Committee: Chairman, Sir Robert Borden; Vice-Chairman, Hon. A. K. MacLean; Sir George Foster, Minister of Trade and Commerce; Sir Thomas White, Minister of Finance; Hon. J. D. Reid, Minister of Railways and Canals; Hon. J. A. Calder, Minister of Immigration and Colonization; Hon. Arthur Meighen, Minister of the Interior; Hon. T. A. Crerar, Minister of Agriculture; Sir James Longheed, Chairman of the Military Hospitals Commission, and Hon. Senator Robertson, Minister without portfolio.

**RETURNED SOLDIERS AND PROSPECTING.**

By H. M. Lamb.

The problem of suitably providing for the returned soldier, so that his past services may be rewarded while ensuring that in civil life he shall no less worthily serve the interests of the country, is being earnestly and energetically attacked. Various schemes have been proposed for encouraging and aiding him to settle on the land, and already plans have been well forwarded to carry these into effect. In the training of the disabled men for new vocations excellent work is being done by the Vocational Department of the Military Hospitals Commission, several of the chief officers of which, by-the-way, are members of the Canadian Mining Institute.

Among the occupations open to returned soldiers, and for which many would peculiarly be fitted after a course of training, and might readily embrace, is that of prospecting. In the training of men for this work our universities, the high schools in the mining districts, the Geological Survey and the Provincial Departments of Mines could also doubtless render effective assistance. Of course, the idea that after the war the soldier should be induced to turn his sword into a ploughshare is an admirable one. Many doubtless will take advantage of special opportunities that will be afforded them to settle on the land. To others, however, the routine of farm life will present few attractions. On the other hand prospecting as a career should appeal to the great number of the younger men who have a love of adventure and who desire to follow an active outdoor occupation, provided they be assured it will afford them a livelihood. The country, moreover, could expect to derive a distinct benefit from the experiment of fitting them for it.

After the war the utmost effort will require to be made to stimulate and increase production in order to offset or lighten the burden of debt the Dominion has voluntarily assumed in doing its part in the war. No other industry is potentially more capable of rapid expansion than is mining. During recent years prospecting has declined. The old-time prospector has, in fact, become extinct. The industry has greatly suffered on that account. The statement that vastly the greater part of the two great mineral-producing areas in Canada, namely, the northern extension of the Cordillera in the west, and that embraced within what is known as the pre-Cambrian shield in the east is practically unexplored, is a mere commonplace. The discovery of another "Klondyke," of other regions so uniquely rich as Sudbury or Cobalt or Porepine would contribute materially towards the reduction of our heavy load of war indebtedness. Hence, it is surely worth while to devote some further effort and study to finding a satisfactory solution of the problem that some two or three years ago rather ineffectively engaged the attention of the Canadian Mining Institute of "How to Encourage Prospecting in Canada." Could not a solution be found in the present proposal?

It would seem that the Military Hospitals Commission have an opportunity here of initiating a service of the very greatest usefulness and importance. They could begin by training returned soldiers to become prospectors and they might even go a step further by appealing either directly, or through some other organization, for public support to give the men so trained a fair start. A special committee or commission might, for example, be appointed to organize through-

out the country small syndicates to grub stake parties of newly trained men to prospect in special areas as might be determined; or better results still might be obtained by the formation of a sort of National Exploration and Development Company directed by a board of competent engineers in whom the public would have implicit confidence. The appeal for funds could then be made not only on patriotic grounds, but on the inducement of future substantial profits to subscribers.

It will be objected, of course, that a necessarily perfunctory course of training will not make an efficient prospector of a man who has had no previous experience in this direction. This is probably true enough; but among the men who will return from overseas a fair proportion at any rate will have had some previous knowledge of bush life and there will be many, no doubt, who originally lived in mining camps and who will have done a certain amount of actual prospecting. Men of this stamp could be made first-class prospectors with very little schooling, followed by a season's field work under the direction of a qualified leader. Such leaders could be selected from among the young graduates of the Universities who have specialized in economic geology. This group is also well represented in the Canadian army. Thus by selection, in a comparatively short time a considerable class of professional prospectors could be graduated and their services turned directly to account in exploration. In the meanwhile the education of those requiring a longer course of instruction could be proceeded with, until eventually there would be produced an army of expert explorers to engage in this great and useful task of extending the boundaries of Canada's productive mineral areas and thereby helping to increase the general prosperity of the country. To carry out this programme to a successful final issue, however, it is essential that public interest be enlisted in the scheme from its inception.

**AN "ENGINEER'S" ADVICE.**

The following are extracts from a letter addressed to the superintendent of an Ontario mine. A copy of the letter was sent to us as an indication of the ability of a so called engineer. The industry and the mining profession suffer from the activities of such men as this. His letter reads in part as follows:

"I have been shown some ore out of some stope in the property. Now, as a practical mining man, you must know that this ore has not been shot out of a gun or cannon, but has been fed in from some good ledge, and if you will closely examine the rock where this pocket came from, you will find a small stringer or vein that has fed the ore into its pocket. Closely follow this stringer by shooting, and you will find the ledge from which this pocket has come.

"There never was a pocket of ore found in solid rock that was not fed in by some stringer. It could not be otherwise. You may have to shoot all round to find this feeder, but find it you will. I have often found them with a candlestick, and merely found a little grit at first. Do your very best. You and I both want to make a great success of this mine, and I want you to be a success also. Never mind any men who worked there before. You and I of course know that you have to do exactly opposite to them, because they made an absolute failure of the property, whereas you must make a success."



### FLIN FLON AND MANDY MINES, MANITOBA.

In the October 13th number of "Mining and Scientific Press," San Francisco, is an interesting article by Walter Karri-Davies on a visit to the Flin Flon and Mandy mines, Manitoba. We reprint some extracts here:

"We started from Winnipeg, Canada, by train for The Pas at 9 a.m. on the 6th of August and arrived at our destination at 8.30 next morning. The Pas is a frontier town, but it is clean and comfortable. Take a map of North America, find Lake Winnipeg, picture yourself standing on the northwest corner of the lake facing west. Walk 90 miles due west and you will come to the place where Sir John Franklin's sailors wintered. You may enter the little church and see the seats that his sailors carved, all of which are in good preservation. This is The Pas, in Manitoba, on the bank of the Saskatchewan river.

"At 1 p.m. on August 9th we started down the river on the 'Nipewin' of the Ross Navigation Co., Captain H. H. Ross in command. The Captain belongs to the cultured pioneer type. In normal times he spent part of his life shooting pheasants in England and the rest of the year shooting rapids on the Saskatchewan.

"Next day we arrived at Cumberland House, which is the oldest Hudson Bay trading-station in Manitoba, having been established in 1774 by Samuel Hearne. Crossing Cumberland lake and Namew lake we arrived at Sturgeon landing at the mouth of the Sturgeon river at 5.30 p.m. on the 11th. This trip can be done in 16 hours, but we were delayed owing to the necessity of tuning up the engines on a maiden voyage.

"The name Sturgeon landing expresses all there is to say about this spot. From here last winter the Mandy mine transported about 3,600 tons of high-grade copper ore over the ice from the mine on Schist lake, about 65 miles away, the ore being loaded on barges and towed to The Pas, whence it was sent by rail to the smelter at Trail, B.C., 1,200 miles away. I understand that the ore assays about 22 per cent. copper, 7 per cent. zinc, \$2 gold, and about 3 oz. silver per ton. A heap of about 1,500 tons of ore was still awaiting shipment. Messrs. H. C. Carlisle, D. M. Haynes and C. B. Morgan, together with 100 men and 92 teams of horses were responsible for this creditable piece of work of hauling the ore in the depth of winter over the ice.

"At 5.45 a.m. on August 12th we sailed forth from Sturgeon landing, our party consisting of Messrs. Jack F. Hammill, Henry C. Perkins, John H. Black, William Wallace Mein, the brothers Dan and John Mosher, myself, and four Indians, together with three canoes, tents, mosquito nets, eiderdowns, food, fishing tackle, guns, knapsacks, etc. The natives poled the canoes up the rapids with two of the party to help. The rest of us tramped for nine miles, the walking being over moss, which is called 'muskeg' in Canada. A two-horse wagon carried most of our equipment and one canoe, and we got on the wagon to cross Sturgeon river. Mr. Black took the opportunity of examining the bed of the river to see if it was suitable for a railway bridge. He decided it was, without delaying us. After walking another two miles, we came to Goose River, where we loaded everything into the canoes and sent the wagon back.

"On the way up the river we landed and lunched, and then crossed Goose lake, landing on Gooseberry island on the north side at 3.30, when we camped for the night,

having a swim in the lake before turning in. The island gets its name from the wild gooseberries growing on it. Starting at 5.45 on the 13th, we paddled most of the day, making several portages. Then we crossed Athapapuskow lake, a most beautiful sheet of water with many lovely islands, which look like botanical gardens. The formation in places was limestone, and in other places schist and quartzite. At 5.30 p.m. we arrived at the Mandy mine on Schist lake, a distance of about 65 miles from The Pas. We camped for the night on the mainland near the island on which the Mandy is situated. At the mine, which is owned by the Tonopah Mining Co., we found Messrs. Graham and Kennedy in charge, and they extended the courtesies that real mining men always offer each other the world over.

"The history of the Mandy mine is interesting. A discovery of copper had been made on the mainland, and at the point of the island, claims being staked by the Mosher brothers. Two other prospectors, F. C. Jackson and Sidney Reynolds, later paddled their canoe to the shore of the island. Reynolds went into the bush a short way and pulled up some muskeg, under which he found copper pyrite. Jackson had said to his mate Reynolds when they first went out prospecting, "Now, if we find anything worth while, I want it to be called the Mandy, as it is a name my wife fancies"; so when Reynolds saw the copper ore he called out to Jackson, who was still in the canoe, "Well, here's your Mandy for you." The claim was pegged and registered in Jackson's name. He sold it to the Tonopah company for a 15 per cent. share in profits on condition that they develop it. Now he denies that Reynolds had any interest, and the case has been heard in court, but no decision has yet been given. I do not know what the legal position is, but what I do know is this, that when a man goes out prospecting, and discovers something of value, he should benefit by his discovery and it should not be in the power of any man to take this benefit away from him entirely.

"The Mandy is a glory-hole out of which 3,600 tons of ore has been taken. I understand about 20,000 tons of similar ore has been proved in the lode by diamond-drilling, besides 100,000 tons of disseminated ore that will require concentrating. In any case, there are some millions of dollars to be taken out of this property and I sincerely hope that those benefiting will recognize the moral, if not the legal responsibility to Reynolds, as I am satisfied that his story is substantially true.

"A trip in the canoe and a portage on the 14th brought us to Flin Flon lake, on which is situated the large copper, gold, silver and zinc deposits—now under option to David Fasken of Toronto. Several million tons of ore have been proved already by diamond-drilling. Here we found George Searle, of Nevada City, in charge. The name of Flin Flon was given to this property by one of the discoverers, who had read a book of this name, the hero having found a mine, a hole in the ground, out of which he eventually got untold wealth. The name will probably be changed, as it sounds a little too much like a gay lady robed in a modification of Highland costume, and it is thought that the name, like the costume, is not quite suitable to cover a proposition of such large dimensions. The North-Western Mining & Smelting Co. might be a more suitable name. It is too early to say what place this mine will take in the world; more boring is necessary. All that can be said at present is that it has held up to all that could be expected, and if it answers to its present promise it will be one of the big mines of Canada.

"The people of the Province of Manitoba and the Dominion Government will no doubt take steps to furnish the necessary transportation facilities. Power also will have to be developed. The new wheat railroad to Port Nelson will benefit if it has back freight from a thriving mining district.

"The orebody is about 200 ft. wide; it has been proved by diamond-drill for a distance of 2,000 ft. and to 600 ft. deep. The ore is wider southward where the last drill-hole went through it. Drill-holes show about 2 per cent. copper and 5 per cent. zinc, with \$2.50 in gold and 134 oz. silver per ton. It is recognized by those directing the enterprise that a larger tonnage of such an ore will have to be proved before it warrants the big expenditure necessary to develop a productive mine.

"Having spent a few days at the mine and enjoying the hospitality of Mr. and Mrs. Searfe and Mr. and Mrs. Jack Callenham, we retraced our steps, carrying the impression that a new and important addition has been made to the mineral resources of Canada."

### MINING IN NORTHERN MANITOBA.

Charles R. Miller, ex-governor of the State of Delaware, U.S.A., and vice-president of the Tonopah Mining and Subsidiary Companies, who is now making a tour to the companies' different properties, has just finished a visit to The Pas in connection with the Mandy Mining Company.

Mr. Miller expressed himself as being highly pleased with the progress that has been made and the results obtained by the company's operations in Northern Manitoba.

During Mr. Miller's stay here plans were made for the hauling of several thousand tons of ore from the Mandy Mine property at Schist Lake to the head of navigation during the coming winter, to be hauled to The Pas by boat next summer where it will be put on cars and shipped to the smelter at Trail, B.C.

Mr. Miller was particularly enthusiastic over the development of the many different enterprises being developed in connection with the mining industry of Northern Manitoba. He departed by Friday's train to British Columbia. The Pas Herald.

### A NEW USE FOR COBALT.

Widespread interest has been aroused by the announcement of the discovery of a tool steel stated to be equal in durability and hardness to high-speed steel, but of which tungsten, always difficult to obtain, is not a component. "Cobalterom," as the new steel is called, is made by adding cobalt to chromium-carbon steel. Thorough tests of the new alloy have been made in a large number of important works in England.

Cobalt was formerly used for its coloring properties, but in the past few years new uses have been found for it. It has advantages over nickel for electroplating and is used to considerable advantage in the manufacture of high-speed tool steels. Stellite, an alloy of cobalt, chromium and tungsten, has proved to be superior to high-speed steel for many operations and it is claimed that it will allow of increasing the rate of cutting on the lathe from 20 to 50 per cent. and requires less time for sharpening the tools thus increasing the efficiency of shop production.

The increasing importance and use of this metal, in the production of which Canada has a monopoly, again emphasizes the importance of our mineral resources to Canada and the Empire.—W. J. D.

### Hon. Frank Cochrane Understands That Flotation Patents Are Controlled by Germans in New York

The "Toronto Globe" quotes from Hon. Frank Cochrane's speech at Cobalt, October 24th, as follows:

"I understand that among other things in this country you have the flotation process, which is still controlled by Germans in New York, and they are putting such royalty on it that the mines in this country cannot use it. It will be my business to see Sir Robert Borden on the question, with a view to bringing them to their senses and for the benefit of the mining community to try to get him to cancel their patents.

"We must, however, be fair in the matter, for I believe in being fair even to an alien enemy, and the mines must therefore be prepared to pay a fair royalty. The best thing to do is for the mining men of the district to get together, with a view to getting a fair idea of the value of the patents and the royalty which would be considered fair."

The "Toronto World" quotes Mr. Cochrane as follows: "I understand that the flotation patents are still controlled by Germans in New York, and they are demanding such a royalty on the process that the mines in this country cannot use it. It will be my business to see Sir Robert Borden on this question, when I return to Ottawa, with a view to bringing the patent owners to their senses and try to get him to cancel these patents for the benefit of the mining community.

"We must, however, be fair in the matter, for I believe in being fair even to an alien enemy, and the mines must be prepared to pay a fair royalty if it is proven that the patent owners were not German controlled."

The "Northern Miner" sends us the following:

Hon. Frank Cochrane, who was Minister of Lands, Forests and Mines in Ontario before entering the Cabinet of the Dominion Government, stated at a "Win-the-War" convention in Cobalt on October 24th, regarding the patents on flotation held by Minerals Separation North American Corporation in Canada: "It will be my business to see Sir Robert Borden on the question with a view to bringing them to their senses, and for the benefit of the mining community try to get him to cancel their patents." He informed the meeting that if, after a thorough investigation, it were found that control was not vested in German alien enemies it would be the duty of the Government to see that the royalty imposed was so reasonable that it would in no way embarrass the industry or in any way retard the developments and production of Canada's metals. In this connection he suggested that the Government would appreciate the advice from mining operators in Canada as to what in their estimation would be considered a fair and reasonable royalty.

### TORONTO BRANCH C. M. I.

At a meeting of the Toronto branch of the Canadian Mining Institute, held October 13th, the following committee for the coming year was elected: E. P. Mathewson, chairman, R. E. Hore, secretary, W. A. Carlyle, T. W. Gibson, H. E. T. Hamilton, R. W. Leach and G. G. S. Lindsey, Jas. McEvoy, W. G. Miller, W. E. Searsworth, C. E. Smith, J. B. Tyrrell.



# The Origin of Sudbury Nickel-Copper Deposits\*

By A. P. Coleman.

Oxygen and sulphur seem to play a somewhat similar part in their combinations with the metals, and compounds of both occur associated with eruptive rocks in ways which suggest that they were originally included in the molten magma; yet certain geologists make a wide distinction between oxides and sulphides in their interpretation of the field relations of these two types of ores. Every one accepts the role of oxides as highly basic portions of magmas which may be segregated when cooling takes place. No one disputes that the titaniferous magnetites and ilmenites associated with gabbros and anorthosites have been parts of the fluid magma from which these rocks were formed; and yet protests are raised against a similar interpretation of sulphides of iron, copper and nickel associated with pyroxenites, dunites and norites. The separation of oxide orebodies from a basic, or even somewhat acid magma, as in the case of the Kiruna magnetites, seems to arouse no hostility; but in some minds the suggestion that the Sudbury sulphide deposits have segregated from the norite with which they are everywhere connected seems to be instinctively objected to as if it were contrary to the laws of nature.

This prejudice against the magmatic origin of sulphide ore deposits is the more surprising when one recalls that the source of the sulphides themselves is always sought in eruptive rocks. For example, we are astonished that the zinc and lead sulphide ores of Missouri cannot be traced certainly and directly to some mass of eruptive. Even if we incline to account for them as derived from marine rocks, we assume that the sea obtained its sulphates from the leaching of former eruptive rocks. The great majority of metallic ores can be traced with certainty through the action of circulating waters to a source in some cooling eruptive mass; and yet some geologists cannot bring themselves to believe that sulphides may accumulate directly through gravity at the lower edge of a cooling magma. To them hot waters are a necessary intermediary.

Questions connected with the theory of magmatic segregation of sulphide ores have been discussed recently by several authorities, with conclusions that vary widely. Goodechild describes the Insizwa nickel ores of South Africa as undoubtedly due to gravitational segregation, and compares them with the nickel deposits of Sudbury. Tolman and Rogers also have made a very careful study of the subject, as far as this can be done by laboratory methods, and their plates give admirable illustrations of the final relations of the different minerals to one another in specimens from most of the known regions; but they seem to have been unfamiliar with the field geology of Sudbury, the most important of all. Their results are interesting as an attempt to harmonize the theory of magmatic segregation with that of replacement by hot solutions. The latest account of the Sudbury deposits, by Knight in the recently published report of the Royal Ontario Nickel Commission, inclines strongly to the aqueous theory. He evidently intended to present the matter impartially and summarizes the usual arguments for the magmatic origin of the ores, but his leaning toward

an aqueous origin is very evident. A little later in the same report the Alexo deposit of northern Ontario is unhesitatingly described by Baker as due to magmatic segregation, though his explanation differs somewhat from the one usually given for the Sudbury deposits. These writers express three entirely distinct and even contradictory views of the origin of sulphide nickel ores, two favoring the theory of magmatic segregation, two occupying an intermediate position, and the fifth favoring the theory of replacement by hot waters.

Knight discusses the matter extensively in a ponderous and on the whole excellent public report and may be supposed to have presented the strongest evidence possible for the theory of hydro-thermal replacement of rock forming minerals in the case of the Sudbury nickel deposits. It is proposed here to examine his evidence to see how conclusive it is.

So far as I am aware Knight's first published work on the Sudbury deposits had to do with the microscopic study of polished sections of the ores, in which a definite order of succession of the minerals was worked out and interpreted as due to circulating hot waters. The metallographic studies of Campbell and Knight were excellent, and their results are in many respects of permanent value; but it may be observed that most of the sections they examined were from offset nickel deposits, where there has been a great amount of faulting, weathering and rearrangement of the materials. That circulating water had much to do with the present condition of these offset ores no one doubts; and it is not surprising that Knight and others who approached the study of the deposits from the metallographic side were impressed by the evidence they presented of water action.

In the study of a complicated set of phenomena one naturally begins with the simplest and least changed examples and not with the more modified and complicated ones. Among the Sudbury ore deposits there are some which are relatively simple and unchanged, such as the Creighton and other great marginal mines, and the search for the origin of the nickel ores should begin with them. If the Creighton orebody was formed by magmatic segregation, all the others, no matter how much they have been modified since, must be accounted for in the same way.

In reading Knight's description of the Sudbury relationships one is struck by his defensive attitude. For instance the statements of T. L. Walker, Barlow and the present writer in regard to the magmatic segregation of the norite-micropegmatite sheet with which the ores are associated are accepted only with the complaint that "one is not able to say that there is a gradual transition from basic to acid rock as one goes from the outer to the inner edge." The idea seems to be that the admission of magmatic segregation in the rock hints at the segregation of the orebodies as well. The objection that the upper edge of the sheet is not quite so acid as the average micropegmatite leaves out of account the fact that much stoping and digestion of the overlying sediments has been proved, which must have modified the composition of the upper edge. In regard to the lower edge also there is a curious suggestion that the norite sometimes has a "gigantic dike-

\*Reprinted from "Economic Geology," Vol. XII, No. 5.

like form," apparently another attempt to disarrange the magmatic machinery. This difficulty is easily met by the well-known proofs of faulting on a considerable scale along the southern nickel range. The objections to the segregation of norite from micropegmatite and to the sheet-like form of the eruptive are not pressed strongly; and to one who has worked in detail round the margin of the sheet have no weight whatever.

The arguments against the magmatic segregation of the orebodies in general are given more formally, and are somewhat surprising. For instance the statement is made that in marginal deposits "the commercial orebodies occur almost wholly in the rocks adjacent to the norite and not in the norite. The contact between commercial ore and norite is generally a comparatively abrupt one." Now the theory of magmatic segregation of ores by the aid of gravitation demands just this condition. The ores should be beneath the norite and in the hollows and fissures of the country rock. As to the second statement one finds a few pages later that at Creighton "some of the mineralized norite near the deposit contains from 1.5 to 2.5 per cent. of nickel and copper combined," showing that the gravitational separation was not complete.

To the statements of Barlow and myself that blebs of ore occur on a large scale in perfectly fresh norite where even the hypersthene is unchanged, the extraordinary objection is made that at some deposits "it is so badly decomposed and altered to a schist that it is difficult to distinguish it from other altered rocks." Surely the fact that some of the norite has been altered has nothing to do with the original condition of parts which are admitted to be "very fresh." This is an exact reversal of the correct line of argument. If large amounts of ore are scattered through perfectly fresh norite they must have been present in the magma before it cooled and crystallized.

The next objection is equally curious, namely, that quartz and calcite occur with the ores at several of the mines, such as the Garson and Crean Hill, indicating the action of water. These mines were proved by the present writer to have been greatly faulted and shattered after they were originally formed as marginal deposits. These later changes have naturally permitted the circulation of water, completely altering the character of the ores. In the case of the Crean Hill mine the deeper workings, below the planes of faulting, show an orebody of the ordinary marginal character.

Another singular argument against magmatic segregation at Creighton is this: "if the granite foot wall at Creighton is younger than the norite, then it was manifestly impossible for the sulphides to have settled from the norite upon this granite." But the granite has not been shown to be younger. Both Barlow and the present writer believed it to be older than the norite; but even if younger, of which Knight gives no proof, it is quite as possible for it to have pushed up beneath the orebody as anywhere else. In fact, as both Barlow and myself have shown, there are granites of more than one age in the region, some older and some younger, but they have no more bearing on the formation of the orebodies than the green tones, older norites, and diabases found as country rocks at most of the mines.

The suggestion that there "are too many notable exceptions to the statement that the largest orebodies are found where bays of the norite project into the country rock" is quite incorrect. Of the two supposed

exceptions noted the Crean Hill deposit is shown by the plans of the mine to be in a small, well defined bay. It is only the surface parts of the ore, which have been faulted inwards for 200 feet or more, which suggest the opposite. As to the other supposed exception to the rule Knight himself explains the deposit as not alone below the norite but actually in the granite beneath it. On the other hand not a single deposit is found at an inward bend of the norite.

Another objection brought against the magmatic theory is the brecciated character of the country rocks enclosed in the ore. Surely there must have been enormous crushing and brecciation of the rocks beneath when the great norite-micropegmatite sheet forced its way between them and the overlying sediments. This brecciation is visible almost everywhere beneath the norite, both where ore occurs and where ore is absent, and evidently has nothing to do with replacement of rock by ore. Knight's own figures of brecciated rock fragments from the Creighton mine show exactly what might be expected when the hot molten ore enclosed them. They were expanded and shattered and one can see how they drifted apart in the ore. His account shows that these blocks are perfectly fresh, which could not have been the case if hot solutions had attacked them, replacing rock minerals by ore.

The magmatic theory explains the facts perfectly, and the aqueous theory is quite incredible for such deposits as the Creighton with perfectly fresh granite and older norite as fragments in the ore and forming the floor beneath, while the hanging wall consists of pyrrhotite-norite, often perfectly fresh also.

That hot water should replace millions of tons of norite and granite by ten million tons of sulphides, leaving even the smallest enclosed fragments fresh and unattacked, without depositing any of the usual gangue minerals, such as quartz or carbonates, and without a hint of banding or cristification is too much to claim. The facts are simply enough explained on the theory of magmatic segregation aided by gravity but impossible by any known hydro-thermal method.

The cubic miles of pyrrhotite-norite above the marginal deposits, often perfectly fresh, as Knight admits, and extending for 2,000 feet away from the hanging wall of the Creighton mine, as he also admits, are surely inexplicable by aqueous action. In reality isolated blebs of ore, sometimes scattered one in a square foot or in a square yard, extend away beyond this limit.

It is hard to see how anyone, after a careful study of the Creighton orebody and its surroundings, can deny the strong probability, if not the certainty, that it was formed by settling out of the norite magma as matte settles from slag; and if this is admitted for the great and scarcely changed marginal deposits it must be admitted also for faulted marginal deposits, like those of Crean Hill and Garson, where water has worked over and rearranged the materials, and for the offset deposits as well, every one of which is accompanied by more or less pyrrhotite norite, still recognizable by its "pock marked" character, though such easily changed rock minerals as the pyroxenes are now replaced by hornblende.

The immense amount of ore scattered as small isolated spots or blebs through the norite above the marginal deposits seems unaccountable by the ingeniously worked out theory of Tolman and Rogers also. These separate spots of ore enclosed in fresh norite and often separated from one another by several inches or even feet of rock could not have been introduced "at a late



magmatic stage by a partial replacement of the silicate minerals." These sulphides must have been present when the rock itself cooled and consolidated, and no theory which does not account for the cubic miles of pyrrhotite-norite near the basic edge of the Sudbury eruptive sheet can be accepted as solving the problem of these greatest of all nickel deposits.

Most geologists who have studied the Sudbury region are satisfied to accept the theory of magmatic segregation aided by gravity, the ores settling down directly into the hollows and fissures of the rock beneath; but there is a possibility that the process was not quite so simple as this statement might suggest. Ernest Howe's idea that the ore of the Creighton mine came in as a later intrusive deserves consideration and is supported by Baker's conclusion that the solid ore of the Alexo mine arrived later than the ore disseminated through the serpentine. While this theory will not account for the pyrrhotite-norite and pyrrhotite-peridotite of the two regions it may well be added on to the usual theory to explain certain features of the deposits where solid sulphides come rather sharply in contact with the hanging wall. The sulphides fuse at a much lower point than norite and must have remained fluid long after it had become pasty or even solid. It is evident that there was much shifting and readjustment of the country rocks during and after the intrusion of the great sill, and one can imagine the jostling of the still liquid ore in one direction or another from time to time as the blocks shifted.

At a later stage, when the ore itself had solidified, further cooling would imply shrinkage and continued adjustments including some faulting, giving entrance in some places to hot waters producing chlorite, talc and other secondary minerals from basic rocks and depositing more or less calcite and quartz with occasional seams or masses of galena or sphalerite; features displayed in faulted marginal mines and also in most of the offsets. Under these circumstances the ores also would suffer some attack and the most susceptible of them, chalcopyrite, would be somewhat segregated along the sides of enclosed rock fragments or in the fissures due to fracturing or cooling of the country rock. Thus the faulted marginal deposits of Crean Hill and Garson, and the offset deposit of Copper Cliff are richer in copper than in nickel, unlike the scarcely modified marginal mines, such as the Creighton and Murray, which contain far more nickel than copper.

Last of all came fissures in both ore and rock filled with dikes of diabase which were rapidly chilled against the cold ore and have a glassy margin. These dikes have had no appreciable effects upon the orebodies except to interfere a little with mining operations.

The sequence of events briefly sketched above is in good agreement with the theory of magmatic segregation under the influence of gravity but quite unintelligible on the assumption that all the ore deposits are due to hot circulating waters.

#### WILL SINK SHAFT AT THE PAS MINES.

The Pas, Man., Oct. 12.—Hal. G. Kennedy, representing The Pas Mines Consolidated Company, on Tuesday, let a contract to Archie Close for the sinking of a fifty-foot shaft, 4 x 6, by eight feet in the clear. The contractor will furnish all the necessities required. Mr. Close went north to Herb Lake by last Muskeg, and expects to commence work on the 20th.

#### ASSOCIATE COMMITTEE ON MINING AND METALLURGY.

The Honorary Advisory Council for Scientific and Industrial Research announces the appointment of an Associate Committee on Mining and Metallurgy. The members are: Frank D. Adams, Ph.D., D.Sc., LL.D., F.R.S., Chairman, Dean of the Faculty of Applied Science, McGill University, Montreal; S. F. Kirkpatrick, M.Sc., Vice-Chairman, Professor of Metallurgy, Queen's University, Kingston, Ont.; Major Charles L. Cantley, B.Sc., Acting Works Manager, Nova Scotia Steel & Coal Co., New Glasgow, N.S.; A. A. Cole, B.Sc., M.A., Mining Engineer, T. & N. O. Railway Commission, Cobalt, Ont.; C. V. Corless, M.Sc., General Manager, Mond Nickel Co., Coniston, Ont.; Th. Denis, B.Sc., Superintendent of Mines for the Province of Quebec, Quebec, P.Q.; Charles Fergie, Esq., President, Intercolonial Coal & Coke Co., 413 Dominion Express Bldg., Montreal, P.Q.; A. R. Globe, Esq., Assistant General Manager, Hollinger Gold Mines, Ltd., Timmins, Ont.; George E. Guess, M.A., Professor of Metallurgy, University of Toronto, Toronto, Ont.; J. C. Gwillim, B.Sc., Professor of Mining Engineering, Queen's University, Kingston, Ont.; E. H. Hamilton, B.Sc., Consulting Metallurgist to the Consolidated Mining & Smelting Co., Trail, B.C.; H. E. T. Haultain, C.E., Professor of Mining Engineering, University of Toronto, Toronto, Ont.; A. Mailhot, B.A.Sc., Professor of Geology, L'Ecole Polytechnique, 228 St. Denis Street, Montreal, P.Q.; E. P. Mathewson, B.Sc., General Manager, British America Nickel Corporation, 8 King St. E., Toronto, Ont.; Lieut.-Col. D. H. McDougall, LL.D., General Manager, Dominion Steel Corporation, Sydney, N.S.; J. G. Morrow, Esq., Inspecting Engineer, Steel Company of Canada, Hamilton, Ont.; J. Bonsall Porter, Ph.D., D.Sc., Professor of Mining Engineering, McGill University, Montreal, P.Q.; Fraser D. Reid, B.Sc., Manager, Coniagas Mines, Ltd., Cobalt, Ont.; W. Fleet Robertson, B.Sc., Provincial Mineralogist, Victoria, B.C.; F. H. Sexton, S.B., President, Nova Scotia Technical College, Halifax, N.S.; A. Stansfield, D.Sc., Professor of Metallurgy, McGill University, Montreal, P.Q.; John T. Stirling, Esq., Chief Inspector of Mines for Alberta, Edmonton, Alta.; R. H. Stewart, B.Sc., Consulting Mining Engineer, 736 Granville Street, Vancouver, B.C.; J. B. Tyrrell, B.Sc., M.A., Consulting Mining Engineer & Geologist, 534 Confederation Life Bldg., Toronto, Ont.; O. E. S. Whiteside, M.Sc., General Manager, International Coal & Coke Co., Coleman, Alta.

#### TO RECOVER SULPHUR.

Many processes have been tried for the economic recovery of sulphur from smelting gases with greater or less success, but it is now reported that sulphur is to be produced by a new process from sulphur dioxide in smelter gases at from \$12.00 to \$13.00 per ton. The waste gases from Sudbury have been estimated to discharge into the air over 100 tons of sulphur per day. Canada possesses no known deposits of sulphur that are of economic importance but there are large reserves of pyrites which contain a high percentage of it.

The development of new processes for its recovery is of special interest to Canadian manufacturers of sulphite pulp and newsprint, now that supplies from Sicily are cut off by the scarcity of ocean tonnage, whilst those from the United States are restricted by the recent imposition of an export license by the United States government.—W. J. D.

## CORRESPONDENCE.

**WANTS LOWER FREIGHT RATES ON PYRITES.**

To the Editor of the Canadian Mining Journal:

Sir,—In your article on the A. I. M. E. meeting at St. Louis, there is considerable space devoted to the increase of production of pyrites, which is essential in making munitions and as a fertilizer.

In publication No. 167 of the Mines Branch, "Pyrites in Canada, Its Occurrence, Exploitation, Etc.," on page 38 the following information is given:

"The consumer's requirements in the vicinity of the Great Lakes alone, including also some points that can be reached from lake ports, is in excess of two hundred thousand tons suitable for acid making. From the report of the Canadian Department of Customs we find that more than half the Canadian pyrites which is exported finds its way to the eastern market, hence the tonnage which reaches the Great Lake market is very small. On the other hand we find that Spanish ore is transported to lake points by rail from the Atlantic seaboard.

"Inasmuch as freight rates to ports on the south shores of the Great Lakes are comparatively low from any Ontario points at which pyrite deposits occur, it would appear as if this section of the United States market offers great possibilities to owners of pyrite deposits in that province.

"In the Lake market Canadian pyrites of suitable quality should command a price slightly higher than in the New York market, the difference being in freight rates."

This publication was printed in 1912, since which time there has been a bigger demand than ever for Lake pyrites.

Having spent two years in the vicinity of the Great Lakes and developing pyrites with good success, I have come to the conclusion that the only way to make the mining of pyrites a possibility is by reduction in freight rates on our transcontinental lines leading into Fort William. This seems to be the main drawback, and the one which seems to frighten the American chemical companies from purchasing pyrites in the vicinity of the Great Lakes, unless the pyrites is laid down at the dock at Fort William. There are very few mining companies in Canada who develop or will help to develop pyrites. The result is we must turn to American chemical companies, or American capital, or leave the properties idle. If one wished to contract for delivery of ore to American ports with absolutely reliable companies, he could sign up for anything from fifty thousand tons per year to five hundred thousand tons. This of course would be divided among three or four companies.

There is at present one pyrite property working in this vicinity. This property is shipping one hundred thousand tons of ore annually. Authentic information, received from those in charge, indicates that freight rates, delay in getting cars, etc., cut the profits to almost nothing, and if it were not for the profits made through production of sulphuric acid this company would cease to operate the property.

If we could get lower freight rates, there is no doubt several properties would open up in the near future.

Yours, etc.,

R. C. GAMBLE

English, Ont., Oct. 22, 1917

**EXTRACTION OF POTASH FROM FELDSPAR.\***

By Hoyt S. Gale.

Potash salts can be readily extracted from silicate or aluminosilicate minerals by any one of several processes. To day, as 50 years ago, the difference between the cost of production and the market price of the product must determine the practicability of extracting it. Feldspar averaging 10 per cent or more of potash can be obtained, but as it is required in very large quantities and must be obtained by cheap methods of mining, which do not require hand sorting, it is somewhat doubtful whether even the most promising deposits will yield material that would average much more than 7 per cent  $K_2O$ . The expense of handling and treating large quantities of such rock in order to recover the small percentage of water-soluble potash it contains has seemed well-nigh prohibitive—at least it has not yet been possible to market any such product in competition with the foreign potash salts. A number of projects are on foot, however, to produce potash from silicate materials, and these projects should not yet be condemned because of their temporary failure to achieve commercial results.

Potash in a form that is insoluble in water—the form in which it occurs in igneous rocks or is fixed in sedimentary rocks—is usually considered unavailable for use in the manufacturing industries or in agriculture. Doubtless much of the potash that is contained in soils has been liberated from insoluble form by slow mineral decomposition, but it seems that for immediate and practical use as fertilizer potash must be in water-soluble form, and this form is demanded by the fertilizer industry. Although there has been some controversy over the matter, it is now generally assumed that a potash-bearing rock, even if it contains more than 3 per cent of insoluble potash, is of very doubtful value as fertilizer until it has been so treated that the potash has been made soluble and so available for ready assimilation by plants. Neither are the insoluble forms of potash available for use in manufacturing industries. The problem of making insoluble potash soluble and thus available for use in agriculture and in manufactures has therefore been widely and carefully studied.

The statement has been repeatedly made that the supply of potash rich silicate rocks, particularly feldspars, is inexhaustible. This statement is undoubtedly true if the stated content of potash is not set too high. Some bodies or areas of pegmatite might supply large quantities of feldspar, but careful investigation of developed deposits has shown that the rock worked contains a large proportion of quartz and soda bearing feldspar and that the feldspar which carries 10 per cent of potash can usually be obtained only by careful hand sorting, which increases the cost of mining and puts a limit on the output from any particular deposit.

A critical examination of many known deposits of feldspar pegmatite indicates that not so much of that rock carries a high percentage of potash as has been commonly assumed, although much pure feldspar can undoubtedly be obtained by sorting the rock from certain large pegmatite dikes, some of which may afford material to support the commercial production of potash and alumina.

\*Extracts from bulletin "Potash in 1916" published by U. S. G. S. Washington



### THE ZINC ORE EMBARGO.

Nelson, B.C., Oct. 24.—Asked regarding the embargo on shipments to Trail smelter of lead ore which contains more than four per cent. zinc, S. G. Blaycock, assistant general manager of the Consolidated Company, stated today that the purpose of the embargo was not to force the mine owners to cut down the zinc contents of their ore to four per cent., but to reduce lead ore shipments. This was necessary, he explained, because the company had a great stock of lead ore piled up and the market for lead in Canada has decreased. Storage capacity was exhausted, and it was therefore absolutely necessary to reduce lead ore shipments.

Instead of refusing to take any lead ores, Mr. Blaycock continued, the company had offered to accept those which did not contain more than four per cent. zinc, the idea being that at least some of the mines could ship some of their higher grade ore and thus meet their payrolls. There was no intention to force the mine owners to cut all ore down to four per cent. zinc. The company realized that this could not be done. The idea, he repeated, was to curtail lead shipments, with the least possible injury to the country.

Curtailement of lead shipments had been the more necessary by the fact that the company was unable, owing to decrease in munitions orders, to sell its lead output in Canada. It had enough ore on hand to keep it busy until the first of the year.

Mr. Blaycock stated that J. J. Warren, managing director of the company, was now in the east and was attempting to find a market for lead. He expressed the hope that this might be accomplished.

Montreal, Oct. 18.—Some time ago the Consolidated Mining and Smelting Company advised outside British Columbia silver ore shippers that it could not accept any further shipments at the Trail smelter owing to the fact that the company was overstocked and did not expect accumulated supplies to be cleared off before December. The management did not consider that the suspension of their purchases would seriously affect the mining situation. Meantime, the receipts from the company's own mines have been growing, and according to the report for the first week of October the receipts amounted to 12,594 tons, an increase of 2,040 tons over the preceding week, and suggesting that the company is getting back to the swing in shipments which existed before the strike.

The suspension of customs purchases of ore has, however, evidently disturbed the independent mines in British Columbia. According to a Victoria, B.C., despatch today, urgent appeals by telegraph continue to reach Hon. Wm. Sloan, Minister of Mines, in connection with the situation arising over the refusal of the Trail smelter to accept any more silver ore carrying over four per cent. in zinc. From all the districts of the interior come the same story, that unless the position is relieved quickly the closing down of many of the silver-lead mines in British Columbia will be a certainty. The Minister despatched a telegram to Premier Brewster urging the necessity for representations to the Federal authorities, and suggesting that he take it up at Ottawa.

Three new Sullivan publications have made their appearance during the past month as follows:

Mine and Quarry for August. Bulletin 75-C, Sullivan WJ-3 and WN-4.

Angle Compound Compressors. Bulletin 75-F, Sullivan Class WC Tandem Compound Steam Driven Compressors.

### LADYSMITH SMELTING WORKS' SALE TERMS.

Mr. Wm. Gardner, of London, England, secretary of the Tyee Copper Company, Ltd., spent several months of the latter part of last year on Vancouver Island, British Columbia, in connection, as it eventually transpired, with negotiations for the sale of the Tyee Copper Company's mining property and smelting works. He returned to England late in December and about two months afterward his report on what he had accomplished was submitted to a meeting of shareholders in the company held in London. This report has only become available to the British Columbia correspondent of The Canadian Mining Journal, who sends the following:

In calling upon Mr. Gardner to give particulars of his visit to British Columbia and the results achieved while in that province, the chairman of the company, Mr. T. H. Wilson, observed that the Board of Directors had every reason to believe that, provided the contract is fulfilled, Mr. Gardner had entered into it on the best terms obtainable in every respect.

#### Mr. W. Gardner's Report.

Mr. Gardner said: "Our smelting works at Ladysmith, Vancouver Island, B.C., has, as you know, been shut down for some years past, and the agreement with the Ptarmigan Mines Company, from which we expected such good results, has proved nugatory owing to the war, and left us stranded. In these circumstances and in view of the price of copper having greatly increased, owing to the demands caused by the war, the directors of this company decided to send me out to British Columbia to see whether in conjunction with Mr. W. J. Watson, our general manager, I could open up negotiations for the disposal of our property.

"I left England on August 11th last and arrived in Victoria on August 25th. Before leaving I had several interviews with Sir Richard McBride, the Agent General for British Columbia in this country, and he provided me with letters of introduction to the Hon. W. J. Bowser, the Prime Minister, and to Hon. Lorne Campbell, the Minister of Mines, beside writing direct to his Government asking them to do all they could to forward the object of my mission.

"As soon as possible after my arrival in Victoria I got into touch with the Government, but found that owing to an impending election for the Provincial Parliament, it was impossible to do anything, official or otherwise, until after the elections were decided—a fortnight later.

"A change of Government took place and our hopes of obtaining their active support disappeared as the new Government fell heir to an empty treasury and heavy liabilities, but they will do their best to help the mining industry, which is one of the chief assets of their Province.

"This enforced delay of more than a fortnight was not, however, wasted, as during that time I was successful in arranging the coke and water supplies for the smelting works, matters of great importance which eventually assisted very considerably in completing the negotiations with the purchaser, who will be greatly benefited thereby.

#### Negotiations for Sale of Property.

"Having got these matters satisfactorily straightened out, I applied myself to negotiations for either selling or leasing the company's plant. The custom of local newspapers of recording the arrival of a newcomer at any of the hotels, and stating the object of

his visit, soon dispels any degree of privacy one might desire to maintain. I was fortunate in getting in touch with the representatives of two strong groups, one proposing to buy outright and the other to lease the smeltery, and eventually I decided to negotiate with the one desirous of purchasing. After long and anxious negotiations, during which the interests of our company were carefully safeguarded, I finally accepted and signed on behalf of the company and the mortgagee the agreement which the chairman will ask the company's solicitor to explain to you, and which was drawn up in the form of an 'Option to Purchase.' In an agreement of this kind it is most desirable that the purchaser should be strong financially, and this desideratum, I believe, I have secured. The purchaser is Mr. Seiberling, the president of the Goodyear Tire and Rubber Company, of Akron, Ohio. He is reputed to be a man of considerable wealth, and having gone into the purchase of mining properties, must have his own smelting works to treat his ores.

"I am glad to say that my policy of retaining Mr. Watson's services for another six months was more than justified by events, as I can say with confidence that it was his enthusiasm as a manager that sold the smelting works, and the purchaser's representatives made it a condition that Mr. Watson would take the management of the plant, at least until such time as it was put into active operation.

"I may here state that a commission of five per cent. on the purchase price was agreed with the gentleman who introduced the purchaser. This commission is to be paid as and when payments are received by the company.

"As soon as the agreement to purchase was ready, I signed it, having previously obtained the Directors' general approval by cable, and having completed the business for which I was sent out, I returned to England.

"In conclusion, I have no hesitation in saying that we have obtained a good price for our property. If we had not sold our smeltery, the purchaser and his friends would in all probability have erected an entirely new plant, which would have considerably depreciated the value of our property."

#### **Purchase Price is \$310,000.**

Mr. William Morris, of Messrs. Ashurst, Morris, Crisp & Co., solicitors for the Tyee Copper Company, said: "The agreement for the sale of the company's assets in British Columbia is dated December 2nd, 1916, and the parties to it are the Tyee Copper Company, Ltd., of the first part; Mr. Loeffler, the mortgagee, of the second part, and Mr. Seiberling (referred to as 'the purchaser'), of the third part. It provides as follows:

"The purchaser undertakes to put the company's plant in good repair and working condition, as soon as possible, commencing the work within thirty days from the date of the contract and, within six months, to instal a converter plant on the company's smeltery site.

"The company gives the purchaser the option to purchase all the company's property in British Columbia (except money, books, shares and accounts and bills receivable) at the price of \$310,000.

"The option is to continue until December 31st 1920."

Details follow, including terms of payment, \$10,000 having been paid on the signing of the contract, and

the remainder to be paid in stated instalments.

The chairman afterward stated that Mr. W. J. Watson had been appointed the company's technical representative in British Columbia while the contract for sale and purchase is being carried out; that the directors propose that Mr. Wm. Gardner, who has been associated with the company ever since its formation in 1900, shall be elected a director of the company; that the Ptarmigan Mines, Ltd., owes the Tyee Copper Company money under a contract between the two companies, but that this matter is to remain in abeyance until after the war, and that the amount of Mr. Loeffler's mortgage on the Tyee Copper Company's property is £20,000 and there is also due accrued interest £600.

#### **KEORA MINES AGAIN DIAMOND DRILLING.**

J. W. Reed of Timmins, Ontario, has the contract for one thousand feet diamond drilling on the Keora mine in Whitney township, Porecupine district, Ontario. Mr. A. J. Brant, manager of the property, furnishes the following statement:

The diamond drilling last spring opened up four paying veins in the 1,000-ft. hole. Three of these were blind veins; one was cut at about 300 ft., giving \$18 to the ton in gold; another was cut at about 400 ft., running \$33 in gold; another was cut at a depth of about 600 ft., 4½ ft. wide, running \$4.20 in gold. The big or main vein, from twenty to forty feet wide, and proven for a length of 100 ft. on the high ground on the surface, was cut at about 800 ft., the drill hole showing it to be 16 ft. wide. Average values across the whole width were \$6.26 in gold, 8 ft. over \$12. The management has decided on exploring these veins thoroughly, as to the width, length and values, before real aggressive development be proceeded with on the property.

#### **WANT ROAD TO SHININGTREE IMPROVED.**

Sudbury. Steps are being taken to have the water route and the road to Wasanbika and Shiningtree gold camps put into a passable condition. While Charles McCrea, M.P.P., had taken the matter up with the government, a letter from J. F. Black, mine owner, Sudbury, asking that the Board of Trade use its influence in having the work done, was before that body at a recent meeting. A resolution was carried authorizing the forwarding of Mr. Black's letter to Mr. McCrea, accompanied by the board's recommendation that the government do the necessary work.

Owing to it being impossible to repair the roadway this year, due to the lateness of the season, Mr. Black urged that the dams on the water route to the camps be repaired this fall as this route only was available. The leakage of the dams was responsible for the water route being in a very poor condition. At many points of the route there was scarcely enough water to float a canoe.

As an incentive to the Board to take some action to have the necessary work done, Mr. Black pointed out that there would be four or five companies operating in the camps this year, which would mean considerable business for Sudbury. It has been estimated that it will take between \$2,000 and \$2,500 to repair four or five dams and to build a low dam at the foot of Okoya-koula lake. When the work has been done the cost of handling supplies at the camps will be reduced from \$2 to \$1 per hundred pounds, it is estimated.



## USES OF FLUORSPAR

Fluorspar is one of the non-metallic minerals of moderate intrinsic value the demand for which has increased greatly since the beginning of the European war, on account of its usefulness in the metallurgic, ceramic and chemical industries, especially in the manufacture of open-hearth steel, enameled ware, and hydrofluoric acid. Some interesting notes on fluorspar are presented in a bulletin prepared by E. F. Burchard for the United States Geological Survey.

The uses of fluorspar depend on its chemical composition, fluxing properties, and phosphorescence when heated and on its optical and gemlike properties. Its preparation involves separation from other minerals with which it is associated, the treatment including such processes as hand-sorting, crushing, washing, screening, jigging, and flotation, depending on the nature of the ore and the extent to which concentration is practicable. Part of the high-grade ore is ground and shipped in barrels and sacks; the rest is sold in lump form. Where fluorspar is associated with sphalerite, or zinc blende, complete separation of the two minerals has been difficult on account of their nearness in specific gravity. Although fluorspar is useful in smelting iron ores it is harmful to zinc, and the sulphur in the sphalerite cannot be permitted in the iron and steel furnaces, therefore zinc-fluorspar concentrates are of little value unless the fluorite and sphalerite can be cleanly separated. A process for separating these minerals by means of flotation in a dilute solution of aluminum sulphate has been developed, it is reported, at Marion, Ky., the flotation being performed in shallow pans, in which mechanical stirrers are operated.

The three principal industries in which fluorspar is utilized in the United States are, in order of importance: (1) metallurgic work, (2) the manufacture of opalescent glass and sanitary and enameled ware, and (3) chemical manufacture. The highest grade, "American lump No. 1," which runs less than 1 per cent. silica and is white or clear pale blue or green, is sold either ground or in lumps for use in the glass, enameling, and chemical industries, including the manufacture of hydrofluoric acid. Grinding of the pure, clear spar is unnecessary for some purposes, as the lumps readily decrepitate to a powder when heated. The second grade, "American lump No. 2," is used in blast furnaces in the production of ferrosilicon and ferromanganese and in basic open-hearth steel furnaces to give fluidity to the slag without increasing its temperature and to reduce the contents of phosphorus and sulphur. This grade includes colored spar and may run as high as 4 per cent. silica, though most of it is sold with a 3 per cent. guaranty. The lowest grade, "gravel spar," including all that contains more than 4 per cent. silica as well as spar mixed with calcite, is also largely used in basic open-hearth steel furnaces, where it is added to fluxing limestone, and in iron and brass foundries, where it is of value in making the metal more fluid, in permitting the use of greater quantities of lower grades and scrap, and because it tends to carry phosphorus, sulphur and other impurities into the slag. It is estimated that about 80 per cent. of the United States output of fluorspar, mainly in the form of gravel spar, and practically all the imported spar is now consumed

as a flux in the basic open-hearth steel furnaces. In the Bessemer process it has been used in the form of artificial fluorides of iron and manganese.

Fluorspar possesses a considerably higher quantitative efficiency as a flux than limestone, especially in smelting refractory ores; but in all metallurgic operations the proportions of the spar that can be used are limited, as its favorable effects do not increase indefinitely as the quantity is increased. In England and on the Continent the metallurgic use of fluorspar has heretofore been more common than in America, probably because its value has been better understood by European metallurgists.

Other minor metallurgic uses of fluorspar are in the extraction of aluminum from bauxite, in smelting gold, silver, and copper ores, in refining copper, in the electrolytic refining of antimony and lead, and in refining lead bullion. In the last-named process the spar is first converted into hydro fluoric acid. In the extraction of aluminum fluorspar is reported to be fused with bauxite and soda ash into a product resembling an artificial cryolite (sodium-aluminum fluoride), to which more bauxite is added, and from this mixture aluminum is extracted in the electric furnace. Miscellaneous uses that have been reported are as a bond for constituents of emery wheels, for carbon electrodes to increase their lighting efficiency while also decreasing the amount of current required, in the extraction of potash from feldspar, and in the manufacture of Portland cement.

Fluorspar for iron and steel making should carry at least 85 per cent. calcium fluoride and preferably more, and it should be free from sulphides and sulphates. For most other chemical uses it should contain 95 to 98 per cent. or more of calcium fluoride.

Mr. Ambrose H. Monell has resigned as president of International Nickel Co., to join the staff of Gen. Foullois, who is in charge of aviation in France. Mr. Monell is succeeded by Mr. W. A. Bostwick, who for some years has acted as assistant to the president of International Nickel Co.

## GROCH MACHINE TO PORTUGAL.

A few days ago there was shipped from Cobalt a full size flotation testing machine, consigned to the Lloyd Geoffrey Company, New York City, for shipment to Portugal. The machine is to be used for the treatment of ore containing tungsten.

It might be of interest to know that it is being exported to a European country as the direct result of its having been used on flotation demonstration at the National Exhibition held this fall in Toronto, and at the Exposition of Chemical Industries, New York City.

The Groch Machine was described in the Sept. 15th issue of the Canadian Mining Journal.

When the Minerals Separation North American Corporation collects royalties, who gets the money? Some people believe that part of it goes to the credit of Germans; not directly perhaps, but ultimately. It is a matter that needs investigation.

## SPECIAL CORRESPONDENCE

**NORTHERN ONTARIO.****Prospecting in Eby Township.**

Quite a number of prospectors have gone into the townships of Eby and Otto and a large number of claims have been staked on the strength of a new discovery of gold made in Eby township. It is said the discovery has the appearance of being of more than usual importance, having been made in a quartz vein about thirty feet in width, in which a considerable quantity of free gold is showing. The scene of this new discovery is about four miles west of Swastika and about one and a half miles straight south from the Lucky Baldwin at Kenogami Station. William Adair of Haileybury made the discovery.

**Silver Bird.**

The old Silver Bird property is being pumped out in preparation for sampling by the O'Brien mining company at Cobalt. The property consists of approximately twenty acres, all more or less heavily covered with overburden. The location of the property gives good reasons for believing that ore of a commercial value will be located, at any rate it is likely the property will receive a thorough test at the hands of the O'Brien mining company.

**Mapes-Johnston.**

A reorganization of the Mapes-Johnston mining company of Elk Lake has recently been made, and the name of the company has been changed to that of the Brant Mining Company. For several years the Mapes-Johnston was actively developed and a small amount of silver ore was shipped. This property has been the most persistently worked of any in the Elk Lake camp and it was closed down chiefly owing to the lack of labor. Men are now being hired and arrangements made for the operation of the property on a comprehensive scale. Were one property in this district to develop into a profit-yielder it would greatly stimulate the mining activities of this section of the north country, where there are a number of properties that appear to warrant further development.

**Work at Taylor Property Resumed.**

Operations were resumed last week on the Taylor property in the Mackenzie lake district on the Montreal river. This property suspended operations a few months ago due to the lack of money. A force of men and supplies went down the river to start work last week.

**Boston-Hollinger.**

Machinery has been installed, camps built and a road cut into the Patricia Syndicate property in Boston Creek district, preparatory to the extensive development of the property. This property was formerly known as the Boston-Hollinger. It is expected that sinking will begin about the end of the present month. The gold showings on this property were among the best ever discovered in the north country, and the preparations being made for the development of the property is evidence of the faith the new owners have that they will find good values at depth. The property is owned by Montreal and Boston interests, who made the purchase after Mr. Charles O'Connell of the Tough Oakes mine reported on it. A force of about thirty men are employed.

**White Reserve.**

Operations at the White Reserve property in the Maple Mountain district are said to be very encouraging. A number of good veins have been opened up

on the surface and some good grade ore is being bagged ready for shipment. At depth the ore has not occurred as consistently as might be desired; but there is still room for a good deal of optimism. A force of upwards of thirty men are employed at mining, and cutting roads and wood.

**Lake Shore.**

The new eighty-ton mill at the Lake Shore mine at Kirkland Lake should be in operation by the first of the coming year and development work to meet the requirements of the mill is being carried on at the 200-foot level. Deeper levels will not be developed until the mill is in operation, after which the policy of deep mining will be resumed. The mine should be producing sufficient bullion by next spring to make it self-supporting, and it would appear to be not too much to predict that within another year the company will be in a position to disburse dividends.

**Beaver.**

Development work on the 1,600-ft. level of the Beaver Consolidated is understood to be highly satisfactory. Already stoping to the height of 100 ft. has been accomplished on the high-grade vein encountered in the early part of the current year, and it is now the intention of the management to sink a winze on this vein. The main shaft for the time being will not be driven below its present depth.

**Waldman.**

The Mining Corporation of Canada has acquired control of the Waldman property, in Gillies Limit, and development work will be commenced at once. The Waldman adjoins the Savage property of the McKinley-Darragh-Savage mine. The conglomerate in the region of the Waldman is about 150 ft. thick. Three shafts have been sunk on the property, approximately a depth of one hundred feet each. In the early days of the camp a little high grade ore was mined. Now that it is under control of one of the leading Cobalt mines its development will be watched with a good deal of interest.

**Kirkland Porphyry.**

A complete and up-to-date electrically driven mining plant will be installed on the Kirkland-Porphyry property by the end of next month, and the development of the known orebodies will be carried on energetically. Rich ore is being encountered in the shaft at the present time and the development of the property up to the present time has come up to the expectations of the owners.

**Kerr Lake.**

During the month of September the Kerr Lake mining company of Cobalt produced 210,388 oz. of silver, which was about 10,000 oz. above the previous record of the past two months. For the twelve months ended September 30th the average production for the mine has been 216,102 oz. per month. The development of the orebodies at the mine is said to be exceeding the original estimates.

**Mining Corporation.**

Silver production from the Mining Corporation of Canada is being maintained at rate of upwards of 400,000 oz. per month and for the current year it is expected that the production will approximate five million ounces. The ore reserves at the end of 1916 were estimated at three and a quarter million ounces, as compared with four million ounces the preceding year. It is not considered improbable that the Mining Corporation of Canada will close the present year with an increase in its ore reserves.



### **Pittsburgh-Lorrain.**

The Pittsburgh-Lorrain mining company is treating approximately twenty-five tons of ore per day in the old Wettlaufer mill at South Lorrain, which was taken under lease by the former company about a month ago. The mill is working to capacity and giving satisfaction.

### **Hollinger.**

The minimum underground wage at the Hollinger mine in Porcupine is four dollars per day, and a good many of the men are receiving even more than this amount. Development of the mine is proceeding at a rapid rate and it is estimated that this mine is adding to its ore reserves at a rate of more than half a million dollars per month.

### **Nipissing.**

During the month of September the Nipissing Mining Company of Cobalt broke all previous records for the current year in producing \$349,258. Most of the underground work during the month consisted of cross-cutting in the search for new veins, preparing others for stoping and determining the value of other small veins by means of stoping. No new veins were found during the month, but all stopes continued to produce satisfactorily, and nearly all of them are extending their previously known limits. The total production of the mine for the past nine months is estimated at \$2,406,541.

### **McKinley-Darragh.**

About forty feet of drifting has been done on the Cobalt Lake Fault vein at the 400-ft. level of the McKinley-Darragh mine and while the vein is about six feet in width the values are fairly high, thus adding materially to the intrinsic value of the mine. With the new oil flotation plant in operation the output of the McKinley-Darragh should be considerably increased in the near future.

### **Minaker-Kirkland.**

Plans are under way for the installation of a small mining plant at the Minaker-Kirkland property at Kirkland Lake, after which the development of the property will be carried on much more aggressively. At the present time the shaft has reached a depth of forty feet and the vein at this point is highly mineralized, with considerable quartz appearing, and while results of assays have not been made public they are said to be encouraging.

### **Canadian-Kirkland.**

Results obtained to date on the Canadian-Kirkland property are exceedingly encouraging. In one shaft which has been sunk to a depth of 25 ft. the vein shows a width of 12 ft., and is said to give an average assay of eight dollars per ton. It is the intention of the company to sink to the 100 ft. level and run a crosscut to cut the adjoining vein which lies about 100 ft. south, running parallel to the No. 1 vein on which the shaft is being sunk. There are upwards of a dozen strong veins on the surface at this property and the outlook is exceedingly promising. A good road has been built into the property and this will greatly facilitate the installation of the mining plant, which it is intended to instal in the near future.

### **Munro.**

A number of mining companies are now opening up their properties in the Munro district. The most important development in the township, of course, is the Croesus mine, which has reached a depth of 400 ft. where the high grade ore still persists. The new mill is in full operation and the heads are said to be running about fifty dollars to the ton. The next im-

portant development is the Burton Munro, where the main shaft has reached a depth of 265 ft. and excellent ore is being encountered. Considerable visible gold is in evidence in the quartz and the vein possesses many characteristics peculiar to the Croesus. About 40 men are employed at the Burton Munro. The Buff-Munro, Colossus and other smaller properties are also proving up well under development.

### **Elliot-Kirkland.**

The Elliot-Kirkland has encountered the vein on the property at a depth of 300 ft. where it was found to be about 11 ft. in width and carried average values of \$12.60 per ton. The sinking of the shaft and crosscut has taken just about a year, and the company has spent to date approximately \$100,000. The results obtaining are highly gratifying both to the Elliot-Kirkland and also to the Kirkland Lake Gold, as it is reasonable to assume that the intervening 600 ft. between these two working points on the vein will carry equally valuable ore. This is considered as one of the most important developments in the Kirkland Lake camp for several weeks.

### **Rickard.**

Development work on the discovery made in Rickard township some six weeks ago is proving very satisfactory. A test pit has been put down about ten feet and free gold is in evidence, and there are excellent indications of the discovery proving to be of more than ordinary importance.

### **Adanac.**

Recent developments on the 310-ft. level of the Adanac at Cobalt are proving highly satisfactory. A new vein came into the main vein and after a few rounds of shots were put in it widened out to about three inches and contains some very high grade ore. Ore is being bagged daily and a shipment should go forward this fall.

## **CENSUS OF U. S. MINING ENGINEERS AND CHEMISTS.**

The U. S. Bureau of Mines, Department of the Interior, at the request of the Council of National Defense, has just completed a census of mining engineers, metallurgists, and chemists, with the result that 7,500 men engaged in mining and 15,000 men engaged in various chemical industries have been classified according to the character of work in which each one claims proficiency. The classification includes not only specialists in various branches of chemistry and mining, but includes as well a classified list of men who have had experience in foreign countries. It is not the purpose of this census to enable the bureau to act as a clearing house for technical men in obtaining commercial positions.

Van. H. Manning, Director of the Bureau of Mines, in explaining why this census was taken, makes the following statement:

The Bureau of Mines, at the request of the Council of National Defense, has taken a census of mining engineers, metallurgists, and chemists. The reasons for conducting this census are obvious. The war of to-day is one in which chemists and engineers play a far greater role than ever before. The products of the mines, furnaces, factories, and chemical plants are being so rapidly consumed that the highest possible skill is required to keep pace with the destruction everywhere apparent. In the organization of a great army, many classes of specialists are needed, and the

problem is to get the best qualified men for each place. Men with a knowledge of sanitation are essential to the health of the soldiers at the various training camps. Men with an intimate knowledge of pyrotechnics find a place in the manufacture and use of certain signal devices; telephone and telegraph operators are essential for systems of rapid communication, without which valuable time may be lost; coal and iron are absolute necessities for the manufacture of arms and munitions, and many naval vessels cannot be operated without the use of petroleum as a fuel, and motor trucks are useless without gasoline, or spirits obtained with greater difficulty.

Mining engineers, under military control, may be of the greatest assistance in a military way in planning and directing sapping operations; in the digging of trenches; in the erection of special supports such as concrete and steel for trenches, dugouts, and tunnels behind the lines, and in planning systems of ventilation and drainage for such excavations; in rehabilitating or redeveloping wrecked coal and iron mines taken from the enemy; and in increasing the output of minerals for military uses in other districts. Further, the experience of some mining engineers in the use of oxygen mine-rescue apparatus might be invaluable in the exploration of underground saps or dugouts filled with poisonous gases. It is on the theory of being able to place the right man in the right place at the right time that this census has been conducted.

The work of conducting this census was carried out in co-operation with the American Institute of Mining Engineers, and the American Chemical Society. A circular letter was addressed to approximately 5,000 members of the American Institute of Mining Engineers and 9,000 members of the American Chemical Society. This letter requested that each recipient fill out and return a card accompanying the letter, and make himself a committee of one to see that every chemist and engineer of his acquaintance likewise filled out a card. The letter contained the statement that additional cards would be furnished on request. The number of replies received by the bureau was approximately 7,500 men engaged in the mining industry and 15,000 in the chemical industry.

## :-: Markets :-:

### NEW YORK MARKETS.

Connellsville Coke—Spot or contract \$6.00.

\* Fixed under Lever Act.

Strait Tin, spot, f.o.b., nominal, 61.50 cents.

Copper (Government price), 23.50 cents

Prime Lake, no market

Electrolytic, no market.

Casting, no market.

Lead, Trust price, 6.50 cents.

Lead, outside, nominal, 6.50 cents.

Spelter, prompt western shipment \$17½ cents.

Antimony

Chinese and Japanese, nominal, 14.62½ cents.

Aluminum, nominal

No. 1, Virgin, 98-99 per cent., 37.00 to 29.00 cents.

Pure, 98-99 per cent. remelt, 35.00 to 37.00 cents.

No. 12 alloy remelt, 27.00 to 29.00 cents.

Powdered aluminum, 75.00 to 85.00 cents.

Metallic magnesium—99 per cent. plus, \$2.00 to \$2.50.

Nickel—Shot and Ingot, 50.00 cents.

Electrolytic, 55.00 cents.

Cadmium, nominal, \$1.45 to \$1.50.

Palladium, \$115.00.

Quicksilver (Oct. shipment from California), \$100.00.

Platinum—Pure, \$105.00.

10 per cent. Iridium, \$111.00.

Cobalt (metallic), \$2.70.

Tungsten—

Wolframite, \$23.00 to \$25.00.

Scheelite, \$26.00.

Gravel Fluorspar: f.o.b. mines—

Prompt, \$28.00 to \$30.00.

Contract, year 1918, \$25.00.

Silver (official), 83½ cents.

Metal Products.—Following quotations represent mill prices and are strictly nominal except in the case of lead sheets and sheet zinc:

Sheet Copper—

Hot rolled, \$35.00 to 37.00 cents.

Cold rolled, \$36.00 to 38.00 cents.

(Shipments from stock 2c per pound extra.)

Copper bottoms, \$49.00 cents.

Copper in rods (round), \$38.00 cents.

(Square and rectangular), \$39.00 cents.

Copper wire, nominal, Oct., 30.00 to 32.00 cents.

Copper wire, Nov.-Dec., 29.00 to 31.00 cents.

High brass—

Sheets, \$31.25 to 33.25 cents.

Wire and light rods, \$31.25 to 33.25 cents.

Heavy rods, \$28.25 to 30.25 cents.

Low brass—sheet, wire and rods, \$36.75 cents.

Tubing—

Brazed bronze, \$48.25 to 48.50 cents.

Brazed brass, \$44.75 to 45.75 cents.

Seamless copper, \$42.50 to 45.50 cents.

Seamless brass, \$39.00 to 43.00 cents.

Seamless bronze, \$52.00 cents.

Full lead sheets, 11.75 cents.

Cut lead sheets, 12.00 cents.

Sheet zinc, f.o.b., smelter, 19.00 cents.

\*For delivery at mill convenience.

### STANDARD EXCHANGE.

(J. P. Bickell & Co. report the following quotations as of close October 23rd, 1917.)

#### Gold.

	Bid	Ask
Apex. ....	07¼	.07¾
Dome Extension ....	11½	.12
Dome Lake ....	15½	16¼
Dome Mines ....	7.90	8.10
Imperial ....	.02	.02¼
McIntyre ....	1.38	1.39
Hollinger ....	1.95	5.05
New Ray ....	.43	.45
Porcupine Crown ....	.33	.35½
Vipond ....	.23	.23½
Preston ....	.03½	.03¾
Tack Hughes ....	.41	.42½
West Dome ....	16¾	17½

#### Silver.

	Bid	Ask
Alamac ....	.15	.16
Bailey ....	.05¼	.06
Beaver ....	.34½	.36
Buffalo ....	.70	
Chibougamou Forland ....	.12	.12½
Confagat ....	3.30	3.60
Crowe Reserve ....	.25	.25
Gifford ....	.04	.04¾
Great Northern ....	.95	.06



Hargraves .....	.08¾	.09¼
Hudson Bay .....	35.00	40.00
Kerr Lake .....	4.80	5.00
La Rose .....	.39	.44
McKinley .....	.60¼	.61¼
Nipissing .....	8.30	8.55
Peterson Lake .....	.11¼	.11¾
Right of Way .....	.047½	.05¼
Seneca Superior .....	.01½	.02½
Silver Leaf .....	.01	.02
Temiskaming .....	.27½	.28
Tretheway .....	.13	.15
Wettlaufer .....	.05¼	.06½
Mining Corporation .....	4.00	4.20
Provincial .....	.36¾	.37½

## SILVER PRICES.

	New York.	London
	cents.	pence.
October 9 .....	89½	45½
" 10 .....	88½	45½
" 11 .....	88¼	44¾
" 12 .....	.....	44¼
" 13 .....	86¾	44
" 15 .....	86¼	43¾
" 16 .....	85¾	43¾
" 17 .....	84¾	43¼
" 18 .....	84¾	42¾
" 19 .....	83¾	42¾

## TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.
Cobalt oxide, grey, \$1.65 per lb.
Cobalt metal, \$2.25 per lb.
Nickel metal, 45 to 50 cents per lb.
White arsenic, 15 cents per lb.
Oct. 23, 1917—(Quotations from Canada Metal Co., Toronto)
Spelter, 10½ cents per lb.
Lead, 9½ cents per lb.
Tin, 63 cents per lb.
Antimony, 18 cents per lb.
Copper, casting, 32 cents per lb.
Electrolytic, 33 cents per lb.
Ingot brass, yellow, 20 cents; red, 25½ cents per lb.
Oct. 23, 1917—(Quotations from Elias Rogers Co., Toronto)
Coal, anthracite, \$9.50 per ton.
Coal, bituminous, nominal, \$9.00 per ton.

## Locomotives—Light and Heavy

Steam—Fireless—Compressed Air—Contractor's Dinkys, narrow and wide gauge, on hand for immediate delivery



Catalogue and Information Book mailed free to Contractor or Industrial Superintendent—  
\$1.00 to others.

**H. K. Porter Co.** Pittsburgh, Pa.  
1218 Union Building

# Announcement

We have started our new Plate Mill, and are Manufacturing Plate from ¼ in. to ¾ in. thick, 24 in. wide, any weight up to 500 pounds.

**Dominion Steel Foundry Co., Limited**  
Hamilton, Ont.

## The University of Toronto and University College

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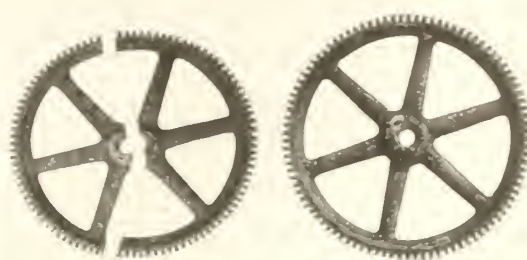
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- The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.
- Building and Ornamental Stones of Canada (Western Provinces). Vol IV., by W. A. Parks, Ph.D.
- Feldspar in Canada. Report on, by H. S. de Schmid, M.E.
- Peat, Lignite and Coal: their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.
- Annual Report of Mineral Production during Calendar Year, 1915, by John McLeish, B.A.
- The Petroleum and Natural Gas Resources of Canada: Vols. I. and II., by F. G. Clapp, M.A., and others.
- The Value of Peat Fuel for the Generation of Steam. Bulletin No. 17, by John Blizard, B.Sc.
- Cobalt Alloys with Non-corrosive Properties. Report on, by H. T. Kalmus, B.Sc., Ph.D.
- Electro-thermic Smelting of Iron Ores in Sweden. Report on, by A. Stansfield, D.Sc.
- Non-metallic Minerals Used in Canadian Manufacturing Industries. Report on, by H. Frechette, M.Sc.
- The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—
- Fuel Testing Laboratory.—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.
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- Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

### GEOLOGICAL SURVEY

#### Recent Publications

- Memoir 85. Road Material Surveys in 1914, by L. Reinecke.
- Memoir 87. Geology of a Portion of the Flathead Coal Area, British Columbia, by J. D. Mackenzie.
- Memoir 92. Part of the District of Lake St. John, Quebec, by John A. Dresser.
- Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.
- Memoir 94. Ymir Mining Camp, British Columbia, by Charles Wales Drysdale.
- Memoir 95. Onaping Map-Area, by W. H. Collins.
- Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.
- Memoir 97. Scroggie, Barker, Thistle and Kirkman Creeks, Yukon Territory, by D. D. Cairnes.
- Memoir 98. Magnesite Deposits of Grenville District, Argen-teuil County, Quebec, by M. E. Wilson.
- Map 57A. Frank, Alberta (showing the landslide of 1903).
- Map 63A. Moncton Sheet, Westmorland and Albert Counties, New Brunswick. Topography.
- Map 151A. Nansen and Victoria Creeks, Nisling River, Yukon Territory.
- Map 152A. Kluane Lake, Yukon Territory.
- Map 154A. Southwestern Yukon.
- Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.
- Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties. Ontario. Topography.
- Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.
- Map 166A. Portion of Flathead Coal Area. Kootenay District, B.C. Topography.
- Map 182A. Portion of Flathead Coal Area. Geology.
- Map 186A. Explored Routes between Lake Athabaska and Great Slave Lake on the Tazin, Taltson, Slave and Peace Rivers.
- Map 1667. Slocan Mining Area, Kootenay District, B.C.
- Map 1677. Coleraine Sheet, Megantic and Wolfe Counties, Quebec.
- Applicants for publications not listed above should mention the precise area concerning which information is desired.
- Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.
- The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.
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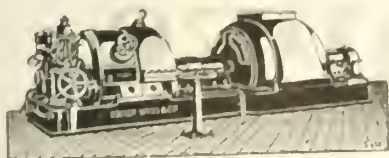
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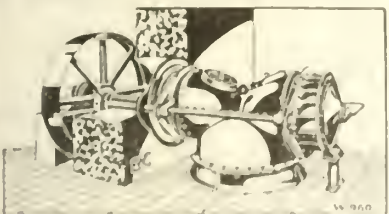
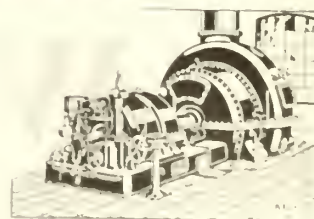
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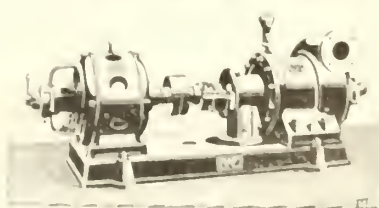
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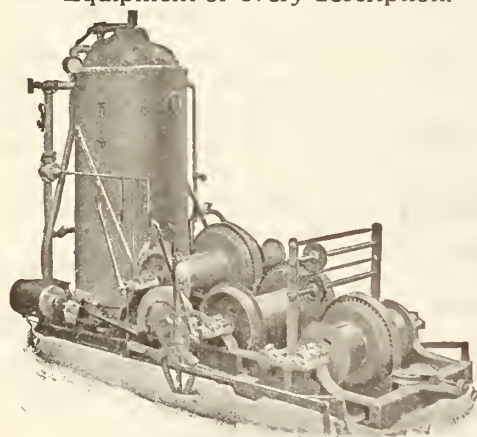
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- Chains—**  
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Jones & Glassco.  
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Thos. Heys & Sons.  
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Ledoux & Co.
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Nova Scotia Steel & Coal Co.
- Coal Cutters—**  
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- Coal Mining Explosives—**  
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Northern Canada Supply Co.
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Northern Canada Supply Co.
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Hendrick Mfg. Co.
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Allan, Whyte & Co.  
Can. B. K. Morton.
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Hull Iron & Steel Foundries, Ltd.
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Lymans, Ltd.  
Mussens, Limited.  
Hull Iron & Steel Foundries, Ltd.  
Wettlaufer Bros.
- Cyaniding Process—**  
Koenig Cyaniding Process Co.
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M. Beatty & Sons, Ltd.
- Diamond Drill Contractors—**  
Diamond Drill Contracting Co.  
Smith & Travers.  
Sullivan Machinery Co.
- Dredger Plus—**  
Armstrong, Whitworth of Canada, Ltd.
- Dredging Machinery—**  
M. Beatty & Sons.
- Dredging Ropes—**  
Allan Whyte & Co.  
Can. B. K. Morton.
- Drills, Air and Hammer—**  
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Sullivan Machinery Co.  
Northern Canada Supply Co.
- Drills—Core—**  
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- Drills—Diamond—**  
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- Drill Steel Sharpeners—**  
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C. L. Berger & Sons.
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Sullivan Machinery Co.  
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Northern Canada Supply Co.  
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- Hammer Rock Drills—**  
Mussens, Limited.
- Hangers—Cable—**  
Standard Underground Cable Co. of Canada, Ltd.
- High Speed Steel—**  
Armstrong, Whitworth of Canada, Limited.
- High Speed Steel Twist Drills—**  
Northern Canada Supply Co.  
Armstrong, Whitworth of Canada, Ltd.
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Can. Ingersoll-Rand Co., Ltd.  
Jones & Glassco.  
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Northern Canada Supply Co.  
Wettlaufer Bros.
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Mussens, Limited.  
Sullivan Machinery Co.  
Can. Ingersoll-Rand Co., Ltd.  
M. Beatty & Sons.
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Hoyt Metal Co.
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Can. Ingersoll-Rand Co., Ltd.  
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Hull Iron & Steel Foundries, Ltd.
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- Lamps—Electric—**  
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- Lamps—Tungsten—**  
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- Link Belt—**  
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International Nickel Co.
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International Nickel Co.
- Ore Sacks—**  
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- Ore Testing Works—**  
Ledoux & Co.  
Can. Laboratories.  
Milton Hersey Co., Ltd.  
Campbell & Deyell.  
Hoyt Metal Co.
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Hoyt Metal Co.
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Hendrick Mfg. Co.
- Pig Tin—**  
Canada Metal Co., Ltd.  
Hoyt Metal Co.
- Pig Lead—**  
Canada Metal Co., Ltd.  
Hoyt Metal Co.



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Can. Fairbanks-Morse Co.		Can. Fairbanks-Morse Co.		Can. B. K. Morton		Smart-Turner Machine Co.	
Canada Metal Co., Ltd.		Smart-Turner Machine Co.		<b>Samplers—</b>		<b>Steel—Tool—</b>	
Consolidated M. & S. Co.		Can. Ingersoll-Rand Co., Ltd.		C. L. Constant Co.		N. S. Steel & Coal Co.	
Pacific Coast Pipe Co., Ltd.		Jenckes Machine Co.		Ledoux & Co.		Armstrong, Whitworth of	
Northern Canada Supply Co.		<b>Pumps—Pneumatic—</b>		Milton Hersey Co.		Can., Ltd.	
Smart-Turner Machine Co.		Can. Fairbanks-Morse Co.		<b>Scales—</b>		<b>Surveying Instruments—</b>	
<b>Pipe Fittings—</b>		Can. Smart-Turner Machine Co.		Can. Fairbanks-Morse Co.		W. F. Stanley.	
Can. Fairbanks-Morse Co.		Can. Ingersoll-Rand Co., Ltd.		<b>Screens—</b>		C. L. Berger.	
Northern Canada Supply Co.		Sullivan Machinery Co.		Jeffrey Mfg. Co.		<b>Tanks—Cyanide, Etc.—</b>	
<b>Piston Rock Drills—</b>		<b>Pumps—Steam—</b>		Northern Canada Supply Co.		Hendrick Mfg. Co.	
Mussens, Limited.		Can. Fairbanks-Morse Co.		Hendrick Mfg. Co.		Pacific Coast Pipe Co., Ltd.	
<b>Pneumatic Tools—</b>		Can. Ingersoll-Rand Co., Ltd.		<b>Screens—Cross Patent Flang-</b>		MacKinnon, Holmes & Co.	
Can. Ingersoll-Rand Co., Ltd.		Mussens, Limited.		<b>ed Lip—</b>		<b>Transits—</b>	
Jones & Glassco.		Northern Canada Supply Co.		Hendrick Mfg. Co.		C. L. Berger & Sons.	
Jenckes Machine Co.		Jenckes Machine Co.		<b>Separators—</b>		<b>Turbines—</b>	
<b>Prospecting Mills and Machin-</b>		<b>Pumps—Turbine—</b>		Can. Fairbanks-Morse Co.		Escher Wyss & Co.	
<b>ery—</b>		Can. Smart-Turner Machine Co.		Smart-Turner Machine Co.		<b>Twist Drills—High Speed—</b>	
Standard Diamond Drill Co.		Can. Ingersoll-Rand Co., Ltd.		<b>Sheet Lead—</b>		Can. B. K. Morton Co.	
<b>Pulleys, Shafting and Hang-</b>		<b>Pumps—Vacuum—</b>		Canada Metal Co., Ltd.		<b>Valves—</b>	
<b>ings—</b>		Can. Fairbanks-Morse Co.		<b>Sheets—Genuine Manganese</b>		Can. Fairbanks-Morse Co.	
Can. Fairbanks-Morse Co.		Smart-Turner Machine Co.		<b>Bronze—</b>		<b>Winding Engines—Steam &amp;</b>	
Jeffrey Mfg. Co.		<b>Quarrying Machinery—</b>		Hendrick Mfg. Co.		<b>Electric—</b>	
Northern Canada Supply Co.		Sullivan Machinery Co.		<b>Shovels—Steam —</b>		Can. Ingersoll-Rand Co., Ltd.	
<b>Pumps—Boiler Feed—</b>		Can. Ingersoll-Rand Co., Ltd.		M. Beatty & Sons.		Jenckes Machine Co.	
Can. Fairbanks-Morse Co.		Jenckes Machine Co.		<b>Stacks—Smoke Stacks—</b>		<b>Wire Cloth—</b>	
Smart-Turner Machine Co.		<b>Roofing—</b>		Can. Fairbanks-Morse Co.		Northern Canada Supply Co.	
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Can. Ingersoll-Rand Co., Ltd.		Northern Canada Supply Co.		MacKinnon, Holmes & Co.		<b>Wire (Bare and Insulated)—</b>	
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<b>Pumps—Centrifugal—</b>		Jones & Glassco.		Smart-Turner Machine Co.		Co., of Canada, Ltd.	
Can. Fairbanks-Morse Co.		Northern Canada Supply Co.		<b>Steel Drills—</b>		<b>Zinc Spelter—</b>	
Escher Wyss & Co.		Allan, Whyte & Co.		Sullivan Machinery Co.		Canada Metal Co., Ltd.	
Mussens, Limited.		<b>Rope—Wire—</b>		Northern Canada Supply Co.		Hoyt Metal Co.	
Smart-Turner Machine Co.		Allan, Whyte & Co.		Can. Ingersoll-Rand Co., Ltd.			
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# Ontario's Mining Lands

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Ontario, with its 407,262 square miles of area, contains many millions of acres in which the geological formations are favourable for the occurrence of minerals, 70 per cent. of the rocks being of pre-Cambrian age.

The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Helen, Magpie and Moose Mountain mines.

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Ontario in 1915 produced over 44 per cent. of the total mineral production of Canada, or more than twice that from any other Province. The preliminary report of the Ontario Bureau of Mines shows the output of the mines and metallurgical works of Ontario for the year 1915 to be worth \$57,532,844, of which the metallic production was \$47,721,180. There were 79 producing mines, 62 of which operated at a profit.

The prospector can go almost anywhere in the mineral regions in his canoe; the climate is invigorating and healthy, and there is plenty of wood and good water.

A miner's license costs \$5.00 per annum and entitles the holder to stake out in any or every mining division three claims of 40 acres each.

For list of publications, illustrated reports, geological maps and mining laws, apply to

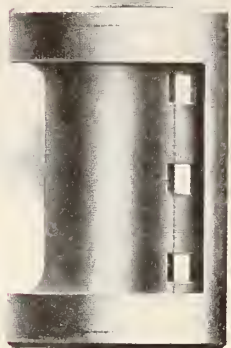
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# Mining Machinery Parts



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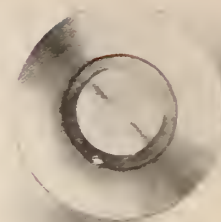
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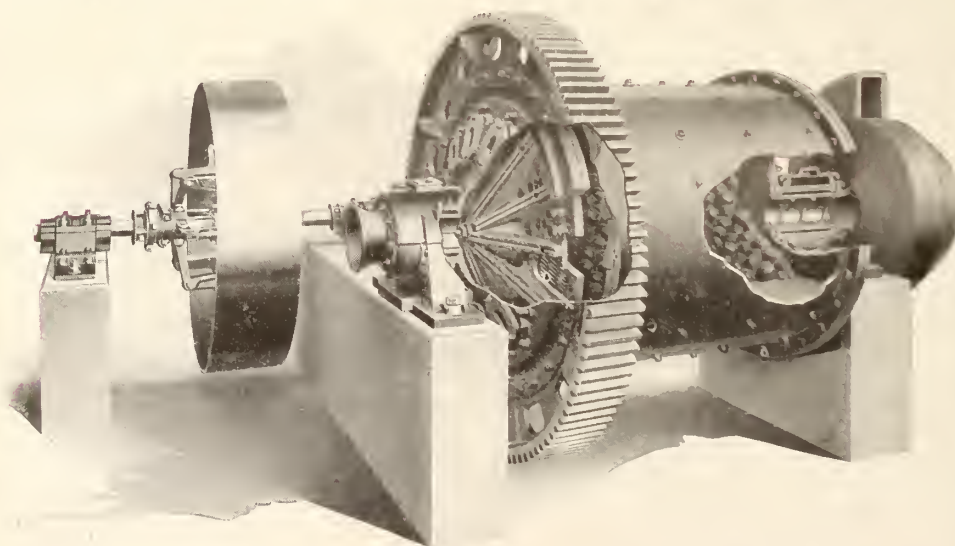
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# **CANADIAN** **MINING JOURNAL**

VOL. XXXVIII

TORONTO

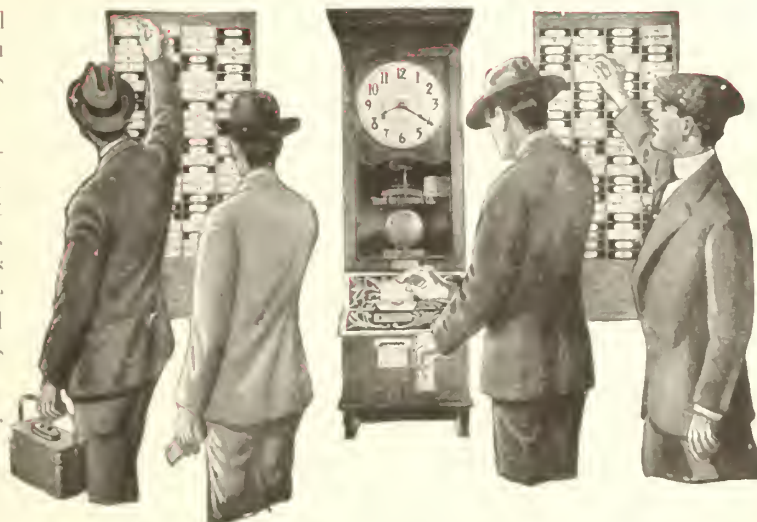
No. 22

## More Ore Can be Mined if We Stop a Big Leak

There are 150,000 men employed directly or indirectly in mining in Canada. The essence of their work is TIME.

Now suppose each employee averages a loss of only one minute each shift every day. It means a yearly loss that is appalling, for 600,000 minutes a day, lost time, amounts in over-paid wages to \$1,200,000 per year. Again—the affect on production of this colossal waste of time (3 million working hours yearly) can be well imagined.

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attaching it to a Sullivan "Cradle" or a Sullivan "Pnufeed" mounting—both one-man rigs. (The "Cradle" weighs 60 lb., the "Pnufeed" 65 lb.)

Hundreds of mines are boosting their output and making good labor shortage with Sullivan one-man Rotators. Why not try them yourself?

Ask for Bulletin 670-A.

Other one-man Sullivan Drills include the "DR-6" mounted water hammer Drifter, and the "FF-12" Lite-weight "piston" drill.

At a time like this, when labor is scarce and becoming scarcer, labor-saving methods and machines are receiving special attention. You can cut your drilling labor and keep up or even increase your tonnage by installing

## SULLIVAN ONE-MAN DRILLS

One of these one-man drills is the *Sullivan Rotator*. It weighs 38 lb., can drill holes for 11½ in. powder up to 12 feet in most grounds; is rapid, powerful and built to stay on the job.

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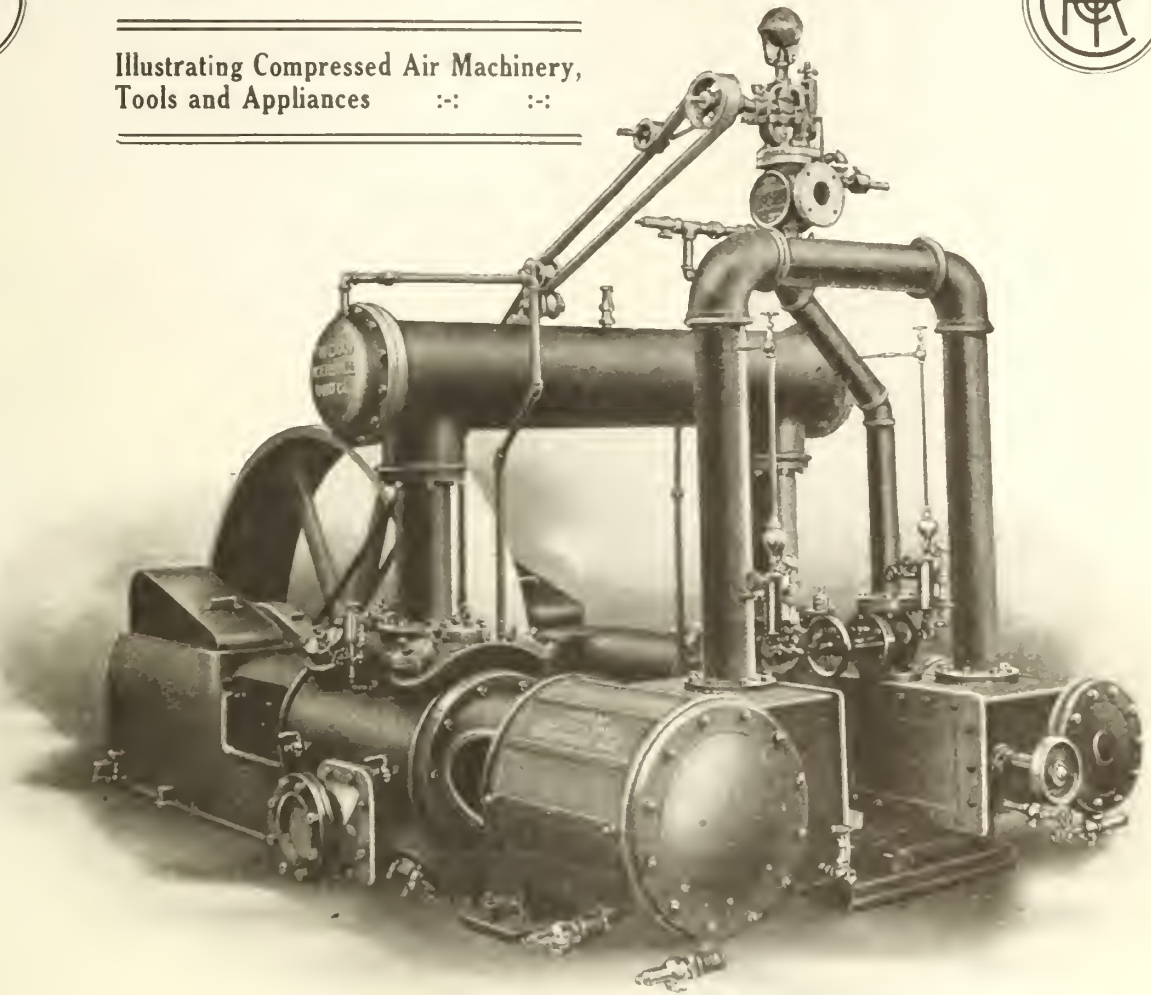
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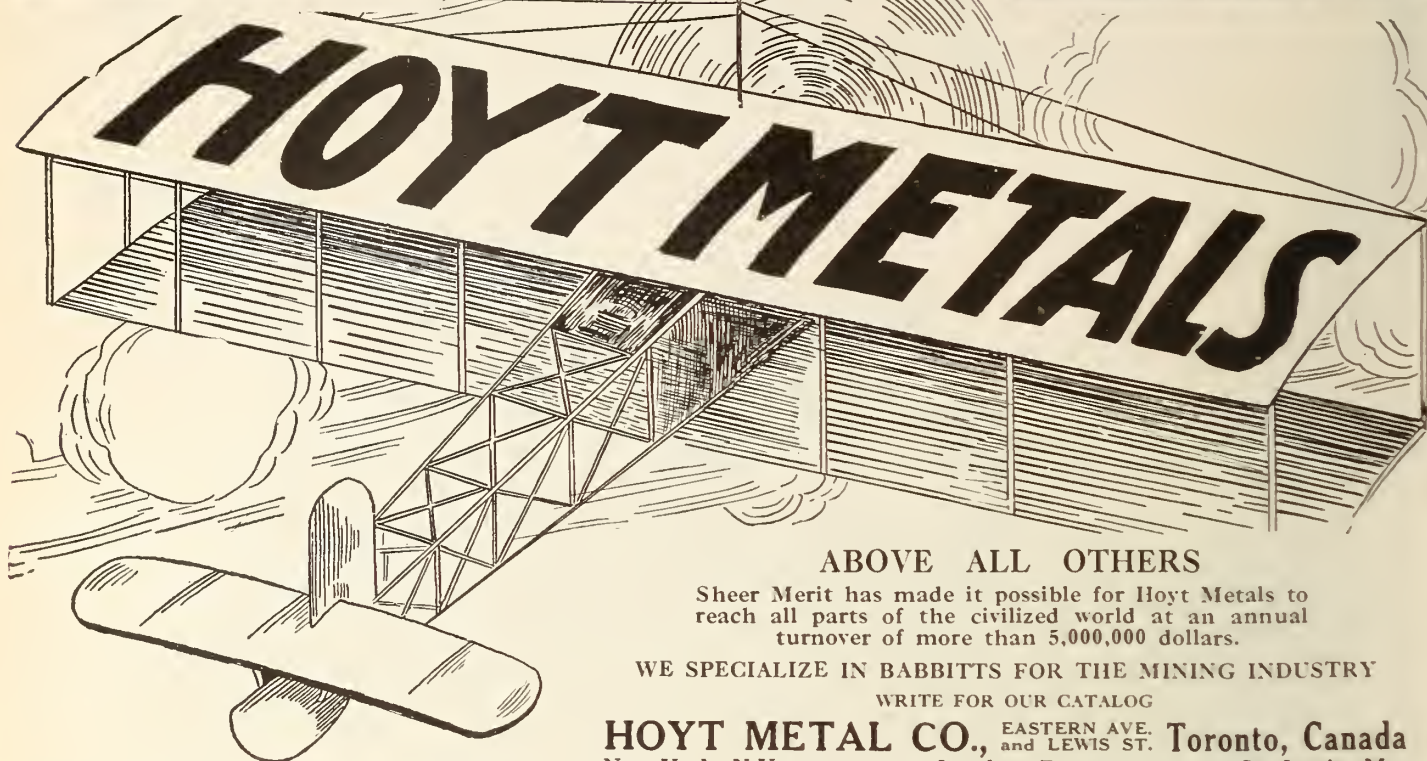
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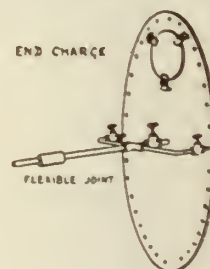
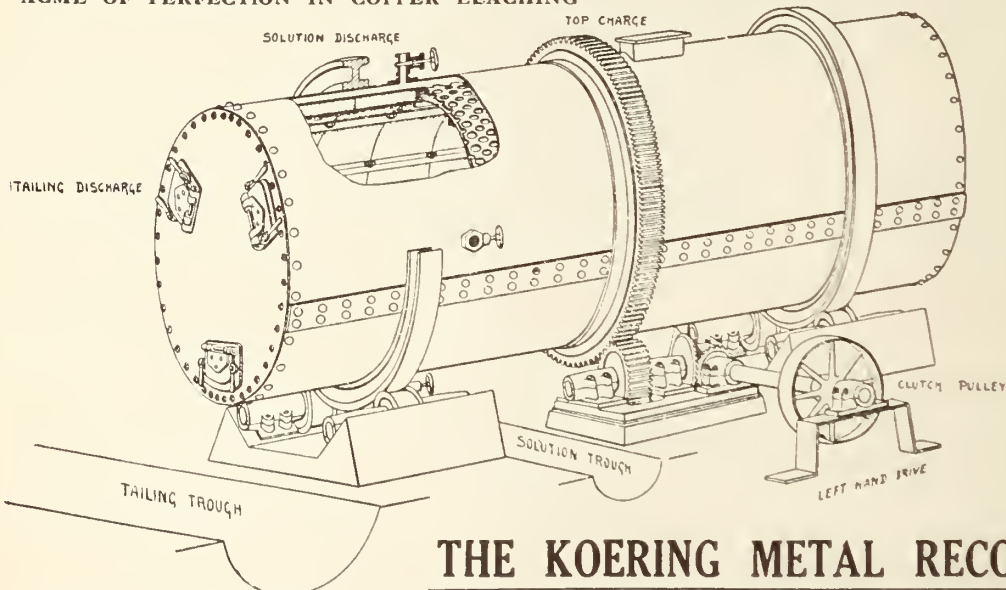
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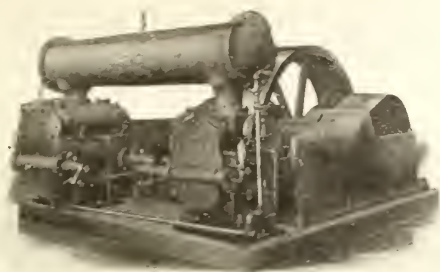
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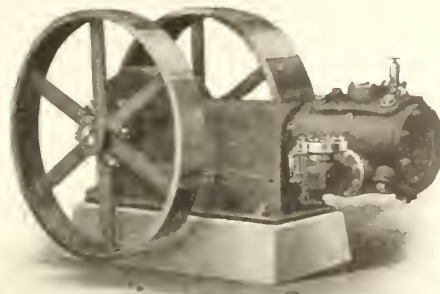
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Nova Scotia possesses extensive areas of mineral lands and offers a great field for those desirous of investment.

**Coal** Over six million tons of coal were produced in the province during 1916, making Nova Scotia by far the leader among the coal producing provinces of the Dominion.

**Iron** The province contains numerous districts in which occur various varieties of iron ore, practically at tide water and in touch with vast bodies of fluxes. Deposits of particularly high grade manganese ore occur at a number of different locations.

**Gold** Marked development has taken place in this industry the past several years. The gold fields of the province cover an area approximately 3,500 square miles. The gold is free milling and is from 870 to 970 fine.

**Gypsum** Enormous beds of gypsum of a very pure quality and frequently 100 feet thickness, are situated at the water's edge.

High grade cement making materials have been discovered in favorable situations for shipping.

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The available streams of Nova Scotia can supply at least 500,000 h.p. for industrial purposes.

Prospecting and Mining Rights are granted direct from the Crown on very favorable terms.

Copies of the Mining Law, Mines Reports, Maps and Other Literature may be had free on application to

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*Commissioner of Public Works and Mines*



## PROVINCE OF QUEBEC

### MINES BRANCH

#### Department of Colonization, Mines and Fisheries

*The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, etc.*

The Mining Law gives absolute security of Title and is very favourable to the Prospector.

**MINERS' CERTIFICATES.** First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

**WORKING CONDITIONS.** During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

**SIX MONTHS AFTER STAKING.** At the expiration of six months from date of the staking, the prospector, to retain his rights, must take out a mining license.

**MINING LICENSE.** The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

**MINING CONCESSION.** Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

**PROVINCIAL LABORATORY.** Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, MONTREAL, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

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# The Flotation Process

All patent and other rights to this process  
in North America are now controlled by

## Minerals Separation North American Corporation

who is the registered owner of the following Canadian patents: Nos. 76,621; 87,700; 94,332; 94,516; 94,718; 96,182; 96,183; 99,743; 127,397; 129,819; 129,820; 134,271; 135,089; 137,404; 142,607; 147,431; 147,432; 148,275; 151,479; 151,480; 151,619; 151,810; 157,488; 157,603; 157,604; 160,692; 160,693; 160,694; 160,846; 160,847; 160,848; 160,849; 160,850; 160,937; 163,587; 163,608; 163,707; 163,936; 165,390; 166,415; 167,474; 167,475; 167,476; 167,603.

On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

### NOTICE

Notice is hereby given that we will enforce our patents and stop all infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

Notice is further given that no one is authorized to introduce our processes or apparatus into the United States, Canada or Mexico.

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The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive, \$94,547,241; for five years, 1896-1900, \$57,605,967; for five years, 1901-1905, \$96,509,968; for five years, 1906-1910, \$125,534,474; for five years, 1911-1915, \$142,072,603; for the year 1916, \$42,290,462.

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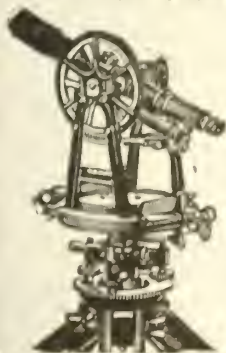
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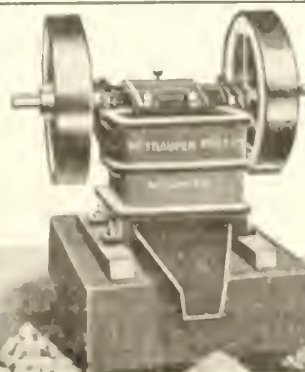


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# THE CANADIAN MINING JOURNAL

VOL. XXXVIII.

TORONTO, November 15th, 1917.

No. 22

## The Canadian Mining Journal

With which is incorporated the  
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Devoted to Mining, Metallurgy and Allied Industries in Canada.

Published 1st and 15th of each month by the  
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### CIRCULATION.

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### DUST BARRIERS IN COAL MINES.

In order to prevent as far as possible the propagation of explosions, inert dust barriers have been installed in several bituminous coal mines in Alberta. These barriers extend from 175 ft. to 200 ft. in length and consist of shelves eighteen inches to twenty-four inches wide with spaces of twenty four inches between them. These shelves are loaded with incombustible dust taken from the combustion chambers of steam boilers, the analysis of this dust showing that it is very satisfactory for this purpose.

### MORE COMMISSION NONSENSE.

Many of our readers have received during the past few weeks an undated circular letter from the Munitions Resources Commission that must have surprised those who read it. They were possibly not surprised to receive such a circular; for similar ones have been widely distributed in the United States, and it was to be expected that some poorly informed commission would be found to imitate our American friends. Many of those who promptly recognized it as a poor imitation of an out-of-date American circular letter, probably consigned it to the waste basket. Those who have read the thing carefully, however, must conclude that the misinformation contained in this sort of letter may be doing considerable harm. Is it not time to stop this childish prattling about our supposed ignorance of our mineral resources and to take steps to check the spreading of lies and misleading information by our poorly informed commissions?

The Munitions Resources Commission in its circular letter says: "Some immediate action is imperative. The first thing is to take a careful inventory of Canadian resources. . . . The work of this Commission is to secure and condense information as to the relative importance of various properties from the standpoint of domestic mineral production. . . . The following minerals are of special importance: pyrite, and pyrrhotite, sulphur, manganese and manganiferous iron ore, lead, nitrate, phosphate, potash, bauxite, chromite, tin, platinum, flake graphite, molybdenite, tungsten, magnesite, sheet mica and high grade refractory clay." It then asks engineers and geologists to send in information concerning deposits in all parts of the country.

The Munitions Resources Commission is, as readers of the circular may easily judge, wholly incompetent for such a task as it proposes to undertake. It evidently knows little concerning our mineral resources and the demand for minerals, and even less about the machinery for gathering and condensing information. It makes foolish misleading statements and then asks for the co-operation of engineers and geologists. The commission will do well to consider whether it has acted wisely in usurping the functions of governmental departments. On whose authority is the commission undertaking to repeat work already done by more capable men?

Why does this commission refuse to recognize the work of years of properly qualified men? Why does the commission spread the foolish report that we do not know anything about our mineral resources? Does it propose to deliberately mislead the public or is it merely exhibiting its own ignorance?



If the Munitions Resources Commission really wants the information it asks for why does it not apply to the Department of Mines at Ottawa? Very complete information is on file there and is readily accessible, although some poorly informed gentlemen, occupying positions which give their words some weight with those who do not know of their unreliability, frequently make statements to the contrary. The Department of Mines has collected information concerning all known important deposits and it is crass stupidity for the Munitions Resources Commission to begin now to duplicate the work already done by better qualified men. If further information is wanted than can be obtained from the Department of Mines and the Bureaux of Mines of the Provinces, these organizations can secure it much more readily than can the Munitions Resources Commission. They will moreover be able to interpret the information obtained; while the Munitions Resources Commission gives no indication in its circular of being able to intelligently compile and condense such information.

The circular sent out by the Munitions Resources Commission is not only evidence of that Commission's inability to deal with the matter, but the action of the Commission is insulting to the Departments of Mines of the Dominion and the Provinces. It is to be hoped that the heads of these capable organizations will not allow the insult to pass unnoticed. The Commission, like other Commissions that are undertaking to interfere with the work of the mining departments, should be put in its place and at once. It is undertaking business that can be better done by others and it has plenty of work which it is better qualified to undertake. It is also, by its ignorance of the mineral industry, creating false impressions.

It is unfortunate that such commissions are given powers which allow them to waste effort and make unnecessary work for their staff. It is to be hoped that this commission can be made to realize that its action will lead to a lot of useless work. If they are men of the caliber which their efforts in other lines indicates them to be, they will recall these foolish circulars and leave our mineral resources to the care of the Mines Departments.

The Canadian Munitions Resources Commission in its circular gives the impression that there is a shortage of lead. Why does it do this? Is it because our lead producers are experiencing such difficulty in disposing of their product?

The Munitions Resources Commission wants deposits of phosphate. Our American neighbors have more than they know what to do with. We have already had a lot of nonsense about phosphate deposits from another commission. Apparently one commission is being affected by the absurdities of the other.

At Sudbury there is going to waste annually 300,000 tons of sulphur which could be manufactured into a million tons of ordinary sulphuric acid. It is not being used because there is not enough demand for acid here to warrant its recovery. And yet the Munitions Resources Commission professes to be worrying about the sources of supply.

If there is a shortage of molybdenite a larger production can easily be obtained by removing the embargo on shipments and allowing producers to receive a price that will warrant the operation of properties that cannot be worked under present conditions.

Information concerning all known important mineral deposits in Canada has been collected by the Mines Branch and Geological Survey. Much of the information has been given to the public in reports. For convenience of reference, a carefully prepared index is available for the years 1863-1906, while a revised up-to-date index is in preparation. Officers of the Department of Mines who have prepared the various reports can be consulted concerning developments since their reports were issued. The files have been arranged for easy reference. Some of those who do not consult the Mines Department make misleading statements concerning the available information, but these statements do not alter the facts. A false impression has been conveyed by repetition of false statements. The Munitions Resources Commission apparently shares this impression.

If a committee on war minerals is needed in Canada, a properly qualified group of men can best be obtained by getting together the heads of the Federal and Provincial Mines Departments. These men know what information is available and they know how to use it. They know how to get additional information and they can use the resources of their departments to get it. Moreover, they know how to interpret the information they collect.

If any engineer or geologist has a nice little tin deposit hidden in the bushes, the Munitions Resources Commission would be pleased to hear of it.

The Munitions Resources Commission must be getting panicky. It evidently does not know enough to refuse to undertake work for which it is not qualified.

It is not surprising that our American friends show some signs of panic in their endeavor to do their utmost to provide munitions. It is not surprising that they exhibit great concern over their scarcity of nickel, for they may have forgotten for a moment that Canada can supply all they want. They will get over that phase of the war excitement soon. It is surprising, however, that our Munitions Resources Commission is willing to imitate this weakness. It professes to be worrying

over phosphate, while the United States has more than it knows what to do with. Are we not Allies? The men who really produce minerals are acting under the impression that we are.

A few years ago the Department of Mines and the Canadian Mining Institute between them dealt with all questions concerning the mineral industry. During recent years certain commissions have been formed which now usurp to some extent the work of these two organizations. The Conservation Commission makes its own reports on certain phases of the mineral industry. The Advisory Council of Scientific and Industrial Research has also been paying much attention to mining and allied subjects. Now the Canadian Munition Resources Committee is sending out misleading circulars. Is not our machinery in Canada becoming a little too complex?

The owners of those phosphate plants in the United States which have been closed down owing to lack of facilities for shipping phosphate to Europe will be pleased to hear that the Canadian Munition Resources Board is getting anxious about the supply of phosphate. Perhaps the Commission intends to put a little more phosphate into those deposits at Banff that the Commission of Conservation delights to talk about.

The Munition Resources Commission wants information on phosphate deposits. If the chairmen of the Advisory Council, the Commission of Conservation and the Munition Resources Commission would have a little phosphate convention and ask someone familiar with the phosphate industry to speak to them, they would get some very helpful information.

There is an opening at Ottawa for a few nice middle-aged deposits of potash ore. Deposits soluble in water will be given preference. Owners will please apply to the Munition Resources Commission.

What are the qualifications of the Munition Resources Commissioners? Who appointed them? Who gave them authority to solicit the co-operation of engineers and geologists to collect information which they would not know how to use when they got it. They don't know how to use the information already available.

Why is the Munition Resources Commission undertaking to make an inventory of our mineral resources and duplicate work already done? Is it because the Commission is unwilling to co-operate with the public departments?

#### ANNUAL MEETING, C. M. I.

The twentieth annual meeting of the Canadian Mining Institute will be held in Montreal on March 6th, 1918.

#### MINERALS SEPARATION.

Under date of November 3 the following editorial was published in "Mining and Scientific Press," San Francisco:

It is apparent from recent issues of the "Canadian Mining Journal," the "Northern Miner," the Toronto "World," and other papers across the border, that the company claiming a monopoly of rights to the flotation process has been under the fire of journalistic shrapnel. The "Canadian Mining Journal" has maintained a dignified and correct attitude throughout this campaign, with the result that it has been attacked by its less responsible contemporaries. A charge has been made that Minerals Separation, more particularly its American subsidiary, is under German control. We stated the facts succinctly in these columns in our issue of October 6. Nothing has happened since to call for a revision of the statement then made. The connection, as agents at New York, of Beer, Sondheimer & Co., a German firm placed temporarily on the black list of the British government, is the chief evidence on which Minerals Separation is charged with being a German corporation anxious to hinder the production of war-metals in the United States and Canada. Since December, 1916, the American business of Minerals Separation has been in the hands of the Minerals Separation North American Corporation, the directors of which are Messrs. John Ballot, S. Gregory, and Frank Altschul, the last holding a commission in the American army. We infer nothing from the naturalized citizenship of this or that director, nor do we think that the efforts to separate the identity of the British parent company from the American subsidiary is of any importance, but we do feel absolutely confident that Mr. J. H. Curle, well known to readers of our paper, and a man of unimpeachable loyalty, as also of unimpeachable honor, could be no party to any attempt to interfere with metal production in the interest of the enemy. Amid the various charges of the Canadian press and the explanations published by Messrs. Ballot and Williams, we place our reliance squarely on the good faith of Mr. Curle, who is a director of Minerals Separation and a close friend of Mr. Ballot. Mr. Curle's association with the enterprise gives us confidence in Mr. Ballot personally and in Minerals Separation as a corporation. We believe that the papers at Cobalt and Toronto are barking up the wrong tree. We agree with them that Minerals Separation, with its attempted patent-monopoly, is a pestilential nuisance to the mining industry, but we see no good in belaboring the issue with false charges. The "Canadian Mining Journal" brushes aside the misstatements of the daily press and reviews the position in an eminently sane fashion. We appreciate our contemporary's reference to ourselves. Our attitude is now prejudiced, for good reasons, but we did not come to the conclusion that Minerals Separation's claims to a monopoly were unjustified by the facts of discovery without first making an honest and thorough inquiry. The patent-mongering company has tried to bluff the metallurgical profession in America by imposing an invalid agreement on technicians employed by its licensees, it has tried to exact extortionate royalties, and it has endeavored persistently to stifle the publication of information concerning the technology of the process. The decisions of



the American courts have been, in the main, favorable to Minerals Separation, but the end is not yet. Meanwhile the patent laws of Canada afford better protection to the public than our own and we expect that any attempt to impose an unreasonable royalty can be defeated. It is to be hoped that the Mines Department of the Dominion will give serious attention to the question, not only in the furthering of metal production, but in the vital interest of the mining industry. Owing to the closer control exercised by the Canadian government over patent royalties and over mining regulations, especially in this time of war, it ought to be practicable to bring the Minerals Separation people, whether in New York or London, into a sensible frame of mind and to make some arrangement with them, whereby the mining industry of Canada may be relieved of an incubus. We hope that the Canadian Mining Institute and the "Canadian Mining Journal" will unite in pressing the subject upon the attention of the Canadian government with a view to granting relief to the mining industry of the Dominion and preventing a further development of a tyrannical, extortionate, and stifling control upon the output of base metals.

Since writing the above we have received a telegram from the "Northern Miner" stating that Mr. Frank Cochrane, who was Minister of Lands, Forests, and Mines in Ontario before entering the cabinet of the Dominion government, stated at Cobalt on Oct. 24 before a "Win the War" convention: "It will be my business to see Sir Robert Borden (the Premier) on the question, with a view to bringing them (the M. S. people) to their senses, and, for the benefit of the mining community, I shall try to get him to cancel their contracts." He informed the meeting that, if, after a thorough investigation it were found that the control was not vested in German alien enemies, it would be the duty of the government to see that the royalty imposed was so reasonable that it would in no way embarrass the industry or in any way retard the development and production of Canadian metals. In this connection he suggested that the government would appreciate the advice of operators in Canada as to what, in their estimation, would be considered a fair and reasonable royalty. This is the summary as telegraphed by our courteous contemporary at Cobalt. We are glad to see that attention is being given by the Canadian government to the question, and we hope that the mining profession in Canada will bestir itself to co-operate with the proper departmental authorities. As to a fair royalty, five cents per ton regardless of quantity would yield a handsome income for the patentees without being burdensome to the operators of mines. The Anaconda and Inspiration companies, with others in that group, are paying 4 cents per ton on an aggregate output in excess of 30,000 tons daily. We do not believe in a royalty based on tonnage because in principle it is unreasonable, and in practice it comes hard on small mining enterprises. Some official fixation of the royalty would be a great relief to the Canadian mining industry, and we wish it were practicable on this side of the border, but we suggest that the Canadian government might do even better, by buying the disputed patent-rights, and then either make a present of them to the mining industry of the Dominion or else charge a small royalty, sufficient to represent 4 per cent. on the purchase. Such a step would serve at once as a strong stimulant to mining development.

From this we deduce that Mr. Rickard's case against Minerals Separation is much the same as that of the Temiskaming mine managers insofar as unreasonableness of the Minerals Separation demands is concerned. He is, however, of the belief that the charge of German control of the N. A. Corporation is false.

While we believe with Mr. Rickard that this charge is false, we nevertheless believe that an investigation is necessary to clear away the suspicion which is a natural consequence of the association with Germans. We believe that the newspapers which laid the charges acted unfairly and that the evidence offered was not of a character to warrant such charges. On the other hand we know that some mine managers are sincerely of the opinion that the corporation is controlled by Germans.

The unreasonableness of the demands of the Minerals Separation corporation must also be considered as warranting investigation and action by Government. No Canadian mine manager should be expected to sign a license with the Minerals Separation corporation until the objectionable features of the license have been removed and a reasonable royalty agreed upon.

The Associate Committee on Mining and Metallurgy of the Advisory Council should at once go carefully into the work of the Council on all matters affecting mineral resources, with a view to preventing the waste of money on foolish projects and the misleading of the public.

#### COBALT MINE MANAGERS BELIEVE MINERALS SEPARATION IS GERMAN CONTROLLED.

Cobalt, Nov. 6.—A special session of the members of the Mine Managers' Association was held here this afternoon. Mr. George Chapman, technical expert to Minerals Separation, was present, and in a brief address said the charges which nailed Beer, Sondheimer & Co. to Minerals Separation were without foundation. In fact he stated that Mr. Ballot had already been in Ottawa, and had placed the affair in the hands of the Canadian authorities, and felt firmly convinced the company representatives would come out clean and be proven free from German influence and control.

When asked as to whether or not the German firm of Beer, Sondheimer & Co. were likely to derive, directly or indirectly, any revenue from royalties paid to Minerals Separation, Mr. Chapman replied that he did not know. He merely knew that Beer, Sondheimer & Company were no longer agents for Minerals Separation, and having been in the employ of the latter company for eighteen years, he could say emphatically that Minerals Separation was not German. In concluding, the Minerals Separation representative requested that he be furnished with statistics as to the amount of ore being treated in Cobalt, and the results obtained, so as to be in a position to take the matter to his directors and in an intelligent manner quote terms of royalty that should be reasonably applicable in the silver mines of this district.

Mr. B. Neilly, President of the Mine Managers' Association, replied that, while the assertions of Mr. Chapman were of interest and sincerely given, the mine managers of Cobalt, as a body, were equally sincere in their

belief that Minerals Separation was German controlled. The whole matter, he said, must rest with the authorities at Ottawa. If, however, the government officials became convinced that Minerals Separation is not influenced or controlled by Germans, then the question of terms of royalty would be in place. But until such time as such proof was forthcoming it would be out of place to give statistics to anyone, in that it might be the means of conveying valuable information to alien enemies.



The late GEO. T. HOLLOWAY.

### INTERNATIONAL NICKEL.

New York, Nov. 7.—Directors of the International Nickel Company reduced the quarterly dividend on the common stock from \$1.50 to \$1 a share on Monday. Report of earnings for the six months ended September 30 showed that surplus for that period was not sufficient to pay the regular common dividend, as the balance after preferred dividend requirements was equal to only \$1.18 a share on the common stock.

Gross income for the three months ended September 30 showed a loss of \$1,139,448 as compared with the previous quarter. This reduction was mainly due, according to an official, to the great increase in costs of labor and materials. The important items which advanced in prices were coal, coke and fuel oil.

Surplus for the six months' period, out of which the present common dividend is to be paid, was \$1,971,320. This surplus showed a loss of \$1,592,473 from the balance shown for the six months ended September 30, 1916. This reduction was practically entirely due to the reserve of \$1,741,140 which was set aside for United States war taxes for the six months' period.

### ELECTRICITY IN COAL MINES.

The great submarine coal-field of Cape Breton offers a wide field for the use of electric power. The problem of the extraction of coal at great distances from the point of entrance of fresh air and power supply is largely that of the transmission of power, and electricity offers the only possible solution in the light of our present knowledge. There are very real dangers connected with the use of electricity at the coal face, but modern improvements in flame-proof motors lead to the hope that, under the spur of necessity, a satisfactory solution will be forthcoming. If, however, objections to the use of electricity at the face are sustained in future practice, it is quite possible to install air compressors, operated by electric power, safely enclosed, and suitably housed at some distance from the coal face, and to convey compressed air in the usual way for the operation of coal-cutters and small haulages at the actual working face.—F. W. G.

The yield of coal in proportion to the number of men employed is relatively high in Nova Scotia. The production per man employed, including all classes above and below ground, will average 2½ tons a day.

### COLLIERY HOISTING EQUIPMENT.

The hoisting equipment at the shaft collieries of the Dominion Coal Company, Nova Scotia, presents some unusual features. At several of the shaft mines in the Glace Bay district the loaded pit tubs are rests on a pivoted platform, and as the cage approaches the bank, the platform is pressed by a spring against a curved termination to the shaft guides, thereby deflecting the platform, tilting the tub and dumping the contents through an end-door into an automatic weigh-tank, from which, after being weighed, the coal passes on to the screens. The pit tubs do not leave the shaft. At other mines the pit tubs are run out on to the flat-sheets in the usual way.

At No. 2 Colliery of the Dominion Coal Company, the loaded tubs are weighed in the pit bottom, after which the coal is emptied by rotary tipplers into large inclined storage shoots excavated in the mine floor. From the shoots the coal is shot downwards into a hopper tank suspended from the hoisting rope, which in passing downwards automatically opens the door of the loaded storage shoot, and is filled with coal. When hoisted to the surface, the tank automatically discharges itself on to the screen. Normally, about six tons of coal is hoisted in the tank. The tank and framework together weigh 10 tons, so that the minimum loaded dead weight on the hoisting rope is between 16 and 18 tons. The entire operation is automatic, the best performance obtained reaching 57 hoists in an hour. So far as known this is a unique colliery hoisting arrangement.

### SAFETY LAMPS USED IN ALBERTA COAL MINES

There are 5,395 safety lamps in use in Alberta. Of these 3,719 are of the Wolf type, 204 of the Kochler type, 287 of the Clauny type, 505 of the Edison type, 600 of the Wico type and 50 of the Ceng type. The Edison and Wico types are electric cap lamps and the Ceng type electric hand lamps. The Edison electric cap lamps have been provided in a number of cases for men engaged in transportation and for miners engaged in the extraction of pillars.



### HISTORY REPEATS ITSELF.

#### Fort Frontenac and the Southwest—Missouri Cobalt.

In one of Parkman's entrancing volumes, "La Salle and the Discovery of the Great West," the voyages of La Salle from Fort Frontenac, now Kingston, Ont., to the Mississippi river, are described. The conditions of travel of that distant time differ so greatly from those of the present as to be almost inconceivable. Concerning the trip from the Illinois river to Fort Frontenac in 1680, Parkman says: "Meanwhile, we will trace the footsteps of his chief (La Salle), urging his way, in the storms of winter, through those vast and gloomy wilds—those realms of famine, treachery, and death—that lay betwixt him and his far-distant goal of Fort Frontenac."

"On the first of March, before the frost was yet out of the ground, when the forest was still leafless, and the oozy prairies still patched with snow, a band of discontented men were again gathered on the shore for another leave-taking."

Arriving at Niagara, "his three followers were all unfit for travel; he alone retained his strength and spirit. Taking with him three fresh men at Niagara, he resumed his journey, and on the sixth of May descended, looming through floods of rain, the familiar shores of the seignory and the bastioned walls of Fort Frontenac." During sixty-five days he had toiled almost incessantly, travelling, by the course he took, about a thousand miles through a country beset with every form of peril and obstruction—"the most arduous journey," says the chronicler, "ever made by Frenchmen in America."

"Such was Cavalier de la Salle. In him, an unequipped mind held at its service a frame of iron, and tasked it to the utmost of its endurance. The pioneer of western pioneers was no rude son of toil, but a man of thought, trained amid arts and letters. He had reached his goal; but for him there was neither rest nor peace. Man and Nature seemed in arms against him. His agents had plundered him; his creditors had seized his property; and several of his canoes, richly laden, had been lost in the rapids of the St. Lawrence."

At the present time another "man of thought, trained amid arts and letters," is making trips from old "Fort Frontenac" to the territory of the "Father of Rivers." The mineral deposits of Fredericton, Missouri, are now under development by a Canadian company, the Missouri Cobalt. Professor S. F. Kirkpatrick, of Queen's University, is directing the erection of a plant, to be completed within a few months, for the treatment of these complex ores, containing lead, copper, nickel and cobalt. But "Fort Frontenac" is now within little more than a 24 hours journey from the Mississippi, a great contrast to La Salle's 65 days. In place of the frowning fort of old a smiling "limestone" city now welcomes the traveller on his return.

Fredericton, distant 108 miles by railway from St. Louis, lies within three or four miles of the historic mine La Motte, which has been worked for lead at various periods during the last two hundred years and is at present being operated on a more extensive scale than ever. "The mine La Motte, upon the head waters of the St. Francis river, was also discovered by a Frenchman, the famous adventurer and explorer M. de la Motte-Cadillac, who founded Detroit. La

Motte discovered the celebrated Golden vein sometime between 1715 and 1719."

While mine La Motte has been known chiefly as a lead producer, the sulphide ores, underlying that of lead and containing nickel, cobalt and copper, have attracted attention and been worked at various times. Prior to 1855 metallurgists of Birmingham and Swansea obtained a supply of nickel and cobalt ores from this mine. About thirty years later a quantity of matte containing cobalt and nickel was produced from these ores and shipped to England.

In 1906 operations were begun under the direction of the well-known metallurgist Mr. V. N. Hybinette. A plant was erected and considerable cobalt oxide was produced; the quantity in 1907 was 2,731 pounds. In 1909 the production was 83,394 pounds of cobalt oxide, 328,403 pounds of nickel, 8,214 tons of nickel and cobalt concentrates, 600 tons of copper and 1,353 tons of lead concentrates. The ore is said to contain, on the average, less than 2 per cent. of lead, over 2 in copper, about 0.9 in nickel and 0.6 in cobalt.

Mr. Hybinette returned to Norway in 1909 and the Fredericton works were closed. He has since been engaged in the production of nickel and copper from Norwegian and other ores by his electrolytic process, which is to be employed in Canada by the British America Nickel Corporation for the treatment of the matte from its Sudbury ores.

The geological structure of the mine La Motte, Fredericton area, is simple. Over an uneven, eroded surface of granite, which varies considerably in texture, there lies in almost horizontal position sandstone which is conglomerate in part. The sandstone does not completely cover the granite, knobs of the latter projecting through the sediment. Overlying the sandstone, and resting in some places directly on the granite, is limestone. Most of the lead ore, galena, occurs in the limestone not far from its lower surface. The copper-nickel-cobalt ores are found in the sandstone. They lie at the contact with the limestone and extend downward to a maximum depth of 15 or 20 feet.

During Mr. Hybinette's operations at Fredericton, Canadian capitalists, represented by those in control of the refining plant at Deloro, became interested in the Missouri deposits. Under their auspices the new plant is being erected. Experience in treating the complex silver-arsenic-nickel-cobalt ores at Deloro is of great value in the Fredericton undertaking. An attractive plant, consisting of several buildings on the edge of an artificial lake, is nearing completion.

The Fredericton plant will be the only important producer of nickel from domestic ores in the United States. It will have an output probably about equal to that of Norway during recent years. Sudbury and New Caledonia are the only other large producers, although the quantity of nickel obtained as a by-product in the refining of copper is increasing. Next to Cobalt, Ont., Fredericton will probably be the largest producer of cobalt. The mining of this metal in New Caledonia has been dormant for some years, although should the price increase mining will likely be revived there. The only other important source of cobalt is the Belgian Congo, where it is associated with copper.

Remembering the internecine strife that has been waged between the "plutonists and neptunists" over the origin of the Sudbury ores, one fears, lest he might unwittingly be drawn into a fray, to say anything concerning the origin of these Missouri ore deposits that have been worked for 200 years. During this



long period doubtless most of the operators have given little heed as to "how the ores got there." They have been much more concerned as to the size of the ore-bodies, the percentage of metal in them, and methods of treatment. They have lived good lives, or otherwise, and have "little recked" that they were face to face with one of the great problems of the universe, the origin of the ores, concerning which certain of their successors on this mundane sphere have had lively controversies. It may be safe to say, however, that while many papers have been written and various theories proposed, there are practically only two schools of thought as regards the origin of these Missouri ores. The adherents of these schools are not known as plutonists and neptunists, but are more properly called descensionists and ascensionists. It is to be hoped that the revival of mining of the cobalt-nickel ores will not, to use a Lyellian phrase, increase the "intemperance of the sects." W. G. M.

### NOVA SCOTIA COAL AND PRODUCTS.

The preparation of coal for the market at the Nova Scotia collieries has not yet reached the elaborate scale noticeable at European coal mines, because, hitherto, the coal has been mined from clean thick seams; but as the inferior and thinner seams come to be worked, more attention to the matter of preparation, and the rejection of impurities from the coal, will be required. In a bulletin written for the Mines Branch and recently published, Mr. F. W. Gray says in part:

All the bankheads at the more recently developed collieries are equipped with shaking screens and picking belts. Coal is sold either as "run of mine," that is, without removal of the slack, or as "screened coal," the slack being taken out. The slack coal, made in the mining, amounts to between 25 per cent. and 30 per cent. of the runmine, and in some cases runs very much higher.

Slack coal for coke making has been washed for many years, and latterly, a little has been washed for the general market. The Dominion Steel Company has a washery on the Campbell "bumping table" principle, with a washing capacity of 100 tons per hour, which prepares coal for the coke ovens.

The Dominion Coal Company, in 1912, erected a "Bann" washer, having a capacity of 120 tons per hour; and three years later the Nova Scotia Steel & Coal Company installed a washer of the same type, but of smaller capacity. The "Bann" washer is of the "jig" type, the principal feature being that the impulse to the washing water in the jigs is given by compressed air. A feature of this washer is the recovery of all the fine coal, and economy in the use of washing water. The Inverness Coal & Railway Company has a small Jeffrey washer.

Several installations for briquetting slack coal have from time to time been put down. The Colonial Coal Company, one of the small companies operating in the Sydney field, successfully manufactured "ovoid" briquettes from slack coal, that found a ready sale, but the plant was destroyed by fire, and has not been rebuilt.

All the Sydney coals are suitable for coke making, and yield a good percentage of by-products. Some of the Pietou coals make an excellent coke, but not all the seams in this district yield a coking coal. Judging by the high percentage of nitrogen shown in the analysis

of the Pietou coals, they should be valuable for use in any way that allows the recovery of the by-products. The Springhill coals do not yield a commercially strong coke, and the seams that are at present mined in the Joggins and Inverness districts are unsuitable for coke-making.

Coke is manufactured in by-product ovens at the works of the Dominion Iron & Steel Company and the Nova Scotia Steel & Coal Company. The by-products recovered are sulphate of ammonia, tar, and latterly, benzol. The waste gases are used in the open-hearth furnaces, in re-heating furnaces, and in the various processes of steel-making, and for steam-raising. The ovens of the Dominion Iron & Steel Company yield from eight to nine gallons of tar per ton of coal carbonized. The tar is taken by the Dominion Tar & Chemical Company, which has a plant immediately adjoining the coke ovens, and is there fractionally distilled for the manufacture of light oils, carbolic acid, creosote oil, disinfecting fluid, protective paints, pitch, and other tar products.

In 1915, the Dominion Iron & Steel Company commenced the recovery of benzol, and the distillation of toluol, at the request of the military authorities. The toluol is shipped to the Province of Quebec for nitration and the manufacture of the high explosive tri-nitro-toluol. Previous to 1915 the benzol had not been recovered.



D. H. McDOUGALL.

General manager, Dominion Steel Corporation.

Mine inspection in Nova Scotia is carried out by a staff of Deputy Inspectors of Mines, reporting to the Inspector of Mines in Halifax, who is also the Deputy Commissioner of Public Works and Mines, reporting to the Commissioner of Works and Mines. The last named office is really that of Provincial Minister of Mines, and the holder is ex officio a member of the Provincial Executive.



# Coal in British Columbia

By E. Jacobs.

The total value of the mineral production of British Columbia in all years to the end of 1916 is shown in the official publications of the Province as having been \$558,560,715. Of this total, the proportion for gold, placer and lode, was \$165,970,887, that for coal and coke was \$165,825,315, that for copper was \$114,559,364, while silver, lead, zinc, and miscellaneous minerals including structural materials and other non-metalliferous products, made up the remainder.

## Brief Review of Production Figures.

The production of coal in British Columbia was begun in 1836, but it was only on a comparatively small scale, for the aggregate output for fifty years, 1836-1885, is shown in the official records to have been but 3,029,011 long tons, which was an average of 60,580 tons a year over that long period. It was not until 1891, which was the fifty-sixth year of production, that the year's output exceeded one million tons. For 1890 the output was recorded as having been 678,140 tons and for 1891 1,029,097 tons, but for five of the six next following years the annual total output was less than 1,000,000 tons a year. After that, however, commencing with 1898, there was a gradual increase until in 1910 the total net production, that is after deduction of the coal used in making 218,029 long tons of coke, was 2,800,046 tons, which was the maximum yearly net output for all years. The gross production of coal for 1910 and each of the six following years to 1916, inclusive, is on record as having been as under:

### B. C. Coal Production (Tons of 2,240 lb.).

For 1910 . . . . .	3,139,235
" 1911 . . . . .	2,297,718
" 1912 . . . . .	3,025,709
" 1913 . . . . .	2,570,760
" 1914 . . . . .	2,166,428
" 1915 . . . . .	1,972,580
" 1916 . . . . .	2,485,580

At the time of writing the 1917 production figures are obtainable only to the end of August, later returns not yet being complete. For eight months the gross production of coal has been approximately 1,536,000 tons. This seems to indicate that there will be a smaller total output this year than last; not that the demand for coal has been less, but that for various reasons it has not been practicable thus far to make a larger production, nor is it expected conditions will admit of the decrease being made up during the remaining months of the year.

## Reports on Coal in British Columbia.

Much information relative to the coal mining industry of the Province is included in the Annual Report of the Minister of Mines for British Columbia, which is obtainable gratis from the Provincial Department of Mines, Victoria. To those who have occasion to refer to statistics covering a long period, there is also the Annual Report on the Mineral Production of Canada, issued by the Mines Branch of the Canada Department of Mines and obtainable upon application to the Director of Mines, Ottawa. The latter publication, though, is necessarily delayed in completion, so that it is not up-to-date, the revision of production statistics and the compilation of tables of figures involving much time

and labor. For instance, the 1914 revised report is the latest yet received. On page 235 of that report can be found a comprehensive table showing the progress of the coal-producing industry of British Columbia over a period of more than fifty years, while other tables also included in the report show the production of districts and of individual collieries during 1913 and 1914, respectively, and this information, while not taking in the progress of the last two years, serves to give a good general idea of the geographical distribution of the coal-producing districts and the proportion of total output of the various collieries in the Province.

Another publication by the Mines Branch of the Canada Department of Mines, giving information relative to the coal fields of British Columbia, as well as of other parts of the Dominion, is that entitled "Economic Minerals and Industries of Canada," this being No. 322 of the Mines Branch publications. The following excerpts are from that report:

"In British Columbia there are three main districts in which coal mining operations are being actively pursued. These are the Crowsnest Pass region, in the eastern part of the Province; the Nicola Valley district, in the central part; and the east coast of Vancouver Island. Beside these, other coal basins are known and more or less prospected, but at present are too remote from means of communication to be of immediate economic value, although they constitute a reserve of fossil fuels with great possibilities.

"**Crowsnest Pass Coal Field.**—The Crowsnest Pass coal field is situated immediately west of the summit of the Rocky mountains, in Crowsnest pass. It is all included within the Province of British Columbia, excepting a small portion which crosses the watershed into the Province of Alberta. The Crowsnest branch of the Canadian Pacific railway crosses the northern part of the coal field, and skirts its western edge for a distance of twenty-five miles. The rocks of the coal field are of Cretaceous age. Mr. Jas. McEvoy has made an approximate estimate of the total available coal in this field. By taking the area covered by the coal measures as being 230 square miles, and assuming a workable thickness of coal seams of 100 ft., which does not appear to be excessive, he arrives at a total quantity of 22,595,200,000 tons. The opening of the coal mines in this field marked an epoch in the development of British Columbia. Before this time the smelting industries of the Kootenays, and of Washington in the United States, had to depend, in a great measure, on coke from the Coast coal mines, the transportation of which, added to a comparatively high initial cost, rendered this fuel very expensive; in fact, the cost of fuel to the smelteries has since then been reduced to about one-half. Three large companies are now operating, and their output last year was more than fifty per cent. of the total output of the Province.

"**Southern Interior Coal Fields.**—The southern interior of the Province contains a number of coal fields of growing importance. Near Princeton, Similkameen, one colliery has been already opened and has made shipments of lignitic coal; but the area of this field is great—probably nearly 50 square miles—so that there

appears a certainty that several other mines will eventually be opened. . . . . The Nicola Valley coal field is situated to the south of Nicola lake. Although not as extensive as the Crowsnest field, nor the Vancouver Island field, it is yet of great economic importance. It stands midway between them, hence the coal of the Nicola valley is manifestly destined to find a market in a considerable part of central British Columbia.

**"Vancouver Island Coal Field.**—Vancouver island has been ever since 1836 the seat of a coal mining industry which in recent years has not only supplied a local demand but has been largely exported, to the State of California. The Vancouver Island fields, now being exploited, are situated on the east coast of the island. These coal measures may be naturally divided into two distinct fields, separated by a gap of twelve miles of crystalline rocks in the district of Nanoose. The northern area is the Comox field, and the southern one the Nanaimo field. Another field, until quite recently quite undeveloped, exists in the vicinity of Squash, about 125 miles to the north. Seven collieries are now in operation in the Vancouver Island district.

"The coals of the various seams, although each has its own individual characteristics, are, as a whole, much alike, and furnish a bituminous coal of fair grade, the amount of fixed carbon in the best quality ranging from 50 to 60 per cent., and the percentage of ash from 5 to 10 per cent. The most striking feature of the seams is their great variability in thickness and character. The thickness varies from a few inches to more than 30 feet, sometimes within a lateral distance of less than 100 feet."

Geological Survey of Canada Memoir No. 69, "Coal Fields of British Columbia," (No. 1465) by Dr. D. B. Dowling, gives much information relative to coal in this Province. There are numerous other published reports on coal measures occurring in British Columbia, generally dealing with individual fields, these including publications of both the Dominion Geological Survey and the British Columbia Department of Mines.

#### Big Coal Deposit.

The following is an excerpt from some Notes by W. F. Robertson, Provincial Mineralogist, as "Annual Report of the Minister of Mines, B.C.," for 1909, p. K. 163: "The Rocky Mountain coal fields, lying on either side of the main range of the Rocky mountains, respectively in the Province of British Columbia and the Province of Alberta, are undoubtedly the most extensive coal deposits in Canada, and, what is more important from a commercial point of view, are the only large coal fields of first class coal on the Pacific slope between Alaska and Mexico. While it has been a matter of common knowledge in British Columbia that these fields are large, it is questioned if more than a few people recognized their wonderful extent, or the enormous influence which they must have on the future of the country. What this influence must be can best be demonstrated by the illustration of what the coal deposits of Pennsylvania have done for that state—they have made it probably the greatest manufacturing state of the Union—and the condition of Western Canada today is that of the Eastern United States fifty years ago, except that we may look for a more rapid development due to the more general development of the rest of the continent and the improved transportation and other facilities now available. It seems, therefore, that Eastern British Columbia is destined to be, from the possession of its coal fields alone, the Pennsylvania of the Pacific slope, and that at no distant date."

#### Production of Coal in 1916 and 1917.

As already mentioned, the coal production figures for the current year to date are not obtainable at the time of writing. An approximate total for eight months to the end of August of nearly 1,536,000 long tons gross has been contributed by the mines in the several producing districts in the following proportions:

District.	Tons of 2,240 lb.
Crowsnest . . . . .	289,464
Nicola and Princeton . . . . .	93,314
Vancouver Island . . . . .	1,153,220

Total for eight months of 1917 1,535,998

Production in the Crowsnest district has been retarded this year by labor troubles and by disasters at two mines that had been considerable producers—one at the Coal Creek colliery and the other at Michel colliery, both owned by the Crow's Nest Pass Coal Company of Toronto. A fairly dependable idea of the proportions of total output of the various collieries may be obtained from the figures of production for 1916, as under:

	Tons of 2,240 lb.
Crowsnest district—	
Corbin Coal and Coke Co. . . . .	69,020
Crow's Nest Pass Coal Co. —	
Coal Creek colliery . . . . .	569,131
Michel colliery . . . . .	244,119
	882,270
Similkameen district	
Princeton Coal and Land Co. . . . .	29,458
Nicola Valley district—	
Inland Coal & Coke Co. . . . .	31,295
Merritt Collieries, Ltd. . . . .	338
Middlesboro Collieries, Ltd. . . . .	49,005
Pacific Coast Coal Syndicate . . . . .	453
	81,091
Vancouver Island—	
Canadian Collieries —	
Comox (Cumberland)	
colliery . . . . .	449,014
Extension colliery . . . . .	256,952
Western Fuel Company	
No. 1 Shaft colliery . . . . .	467,805
Reserve Shaft colliery . . . . .	86,805
Pacific Coast Coal Mines, Ltd. . . . .	153,112
Nanoose Collieries . . . . .	630
Vancouver Nanaimo Coal	
Mining Co. . . . .	78,443
	1,492,761
Gross production for 1916	2,485,580

The disposal of the coal produced in 1916 is shown in the next following table, which will serve to indicate in a general way what becomes of the coal produced in the Province.

#### Coal and Coke Produced, Exported, etc., During Year 1916.

	Tons of 2,240 lb.	
Sales and Output for Year	Coal	Coke
2011 for consumption in		
Canada . . . . .	858,052	233,456
sent for export to U. S. . . . .	837,879	44,377
sent for export to other		
countries . . . . .	6,166	
Total sales	1,702,097	267,833



Lost in washing .....	197,190 .....	
Used in making coke ..	401,487 .....	
Used under colliery boilers, etc. ....	203,085 .....	
Total for colliery use ..	801,762 .....	
	2,503,859	
Stocks on hand first of year.....	33,358 .....	2,633 .....
Stocks on hand last of year.....	15,079 .....	2,525 .....
Difference taken from stock during year..	18,279 .....	108
Output of collieries for year .....	2,485,580 .....	267,725

The next following table gives information as to number and class of men and boys employed in the coal mines last year, and the proportions of them engaged in various occupations:

#### Number of Hands Employed, Etc.

Character of Labor.	Under Ground.	Above Ground.	Totals.
Supervision and clerical assistance	178	86	264
Whites—Miners .....	1,647	....	1,647
Miners' helpers .....	100	....	100
Laborers .....	777	478	1,255
Mechanics and skilled labor ..	527	362	889
Boys .....	71	57	128
Japanese .....	151	....	151
Chinese .....	239	383	622
Indians .....	4	....	4
Totals .....	3,694	1,366	5,060

Another table appearing yearly in the Annual Report of the Minister of Mines shows the output of coal and the per capita production of the various districts. The following covers a period of five years—1912-1916:

#### Output and Per Capita Production of Various B. C. Coal Districts.

Year.	District.	Gross Tons of Coal Mined During Year.	Total No. of Employees at Producing Collieries.	Tons of Coal Mined per Employee for Year.	No. of Men Employed Underground in Producing Collieries.	Tons of Coal Mined per Underground Employee for Year.
1912	East Kootenay District .....	1,261,212	2,410	523	1,780	721
	Coast District .....	1,764,497	4,720	374	3,495	446
	Whole Province .....	3,025,709	7,130	424	5,275	534
1913	East Kootenay District .....	1,331,725	2,666	500	1,965	784
	Coast District .....	1,239,035	3,777	328	2,865	624
	Whole Province .....	2,570,760	6,443	399	4,830	673
1914	East Kootenay District .....	955,183	2,397	399	1,749	532
	Coast District .....	1,211,245	3,335	363	2,518	547
	Whole Province .....	2,166,428	5,732	379	4,267	481
1915	East Kootenay District .....	852,572	1,748	488	1,183	508
	Coast District .....	1,120,008	3,230	347	2,512	708
	Whole Province .....	1,972,580	4,978	396	3,695	504
1916	East Kootenay District .....	882,270	1,674	527	1,125	574
	Coast District .....	1,603,310	3,386	474	2,569	678
	Whole Province .....	2,485,580	5,060	491	3,694	433

(Note.—The Coast District, as above, includes Nicola and Princeton.)

In this connection, the Provincial Mineralogist remarks: "While no figures can be given as to the actual cost of mining in the different fields, the per capita production of these fields is of interest, as having a bearing upon the working costs and as indicating the mining facilities existing and the improvement made in these conditions from year to year."

#### Quantities of Coal and Coke.

In the last Annual Report of the Minister of Mines there are also included two tables showing quantities and value of coal and coke, respectively, produced in all years to 1916, inclusive. The first of these tables

shows that the total net quantity of coal, that is less coal used in making coke, has been 44,894,609 tons of 2,240 lb., and that the total value has been \$145,440,340. It appears in the Mines Branch report, already mentioned, that prior to 1874 the value was calculated at \$4 a ton; then, for twenty-three years to 1906, inclusive, it was \$3 a ton, and since that year it has been placed at \$3.50 a ton.

The total quantity of coke produced in all years, 1895-1916, was 3,615,465 long tons, valued at \$20,388,975. Prior to 1907 coke was valued at \$5 a ton; in that year a change was made to \$6 a ton, which is the rate used ever since. The Mines Branch report gives the number of coke ovens in British Columbia at the end of 1914 as having been 1,570. As there were 130 at Union Bay, Vancouver Island, it is concluded that the remaining 1,440 were all in the Crowsnest district—at Carbondale, Fernie, Hosmer, and Michel. The Canadian Collieries (Dunsmuir) Limited, recently built 170 more beehive ovens, bringing the number up to 300 at Union Bay, and increasing the total number in the Province to 1540.

#### Crowsnest District Coal Mines.

The Crowsnest Pass coal field is situated on the western slope of the Rocky mountains and at a distance of about 375 miles due east from the Pacific Coast. The field is in Fort Steele mining division, East Kootenay, and is about 40 miles north from the International Boundary line. Coal is said to have been discovered in this part of the country about thirty-five years ago. Its stated existence here was alluded to in the Report of Progress of the Geological Survey of Canada for 1880-2. It was again referred to in the report for 1882-4. The coal-bearing area was approximately defined and examined in a preliminary

way by Dr. Geo. M. Dawson in 1883. Later, in 1891, after some of the measures had been prospected, it was visited by Dr. Selwyn, also of the Geological Survey.

The history of the development of these fields dates back to 1887. In June of that year Mr. Wm. Fernie, then of Fort Steele, East Kootenay, and Lt.-Col. Baker, then member of the Provincial Legislature for the district, decided to prospect the coal measures, the existence of which had been reported to them by Mr. Michael Phillips, an old Hindson's Bay Company employee. Every summer, for eight or nine years, Mr.

Fernie took men from Fort Steele to the Elk River district, where they prospected the coal seams outcropping there. A syndicate was formed in Victoria to acquire and develop these coal seams. Eventually a company was organized to take over the syndicate's holdings, and a charter authorizing the construction of the British Columbia Southern railway, was obtained from the Provincial Government, of which Lieut.-Col. Baker was by that time a member. But about ten years (1887-1897) elapsed before these pioneers achieved their object and began to see a return for all their patient and persistent effort. Their reward came with the eventual closing of an agreement with the Canadian Pacific Railway Co. for the construction of the Crowsnest railway. Meanwhile the Crow's Nest Pass Coal Company had acquired the coal lands.

The further history of the development of the coal mines is practically that of the Crow's Nest Pass Coal Company until about 1909. In one year's Annual Report of the Minister of Mines it is stated that "until within the year 1909 there was only one company actually producing coal in the East Kootenay district—that is, the Crow's Nest Pass Coal Company, although this company operated three separate collieries; but during that year two new companies, namely, the Hosmer Mines, Limited, at Hosmer, and the Corbin Coal & Coke Co., at Corbin, were producing. These new companies began to ship coal toward the latter part of 1908, and as they have extensive and fully-equipped collieries, have now become important factors in the coal production of the district." Incidentally, it may be mentioned that about the middle of 1914 operations were suspended at the Hosmer colliery, and it is understood the mines there have been abandoned.

**Crow's Nest Pass Coal Co.'s Mines.**—This company's Coal Creek colliery is situated on Coal Creek, about five miles from the town of Fernie, with which it is connected by a branch railway. The coke ovens of this colliery are at Fernie. The company's Michel colliery is situated on Michel creek, about twenty-three miles northeast from Fernie, on the C. P. R. Co.'s Crowsnest railway. The Great Northern railway also connects with this colliery, passing through Morrissey and Fernie en route. The Carbonado colliery is on Morrissey creek, about fourteen miles southeast of Fernie; no coal mining has been done at Carbonado for about eight years.

Mines being operated at Coal Creek colliery are the No. 1 North, and B. North, with development in progress in No. 9; these mines are on the north side of the valley. On the south side the mines in operation are No. 1 South, No. 1 East, No. 2 and No. 3. The coal from all these mines, the district inspector's last published report states, is conveyed to a central tippie of steel construction, 840 ft. in length, extending across the valley. It is equipped with two revolving dumps, screens, and two picking tables, all of which are worked by electric power. Underneath the tippie are two box-car loaders operated by hydraulic pistons. The several seams of coal occurring at Coal Creek have been very productive during the period of nearly twenty years since the production of coal was commenced here.

Mines being operated at Michel colliery are No. 3 East, on the south side of the valley, and New No. 8 on the north side. The tippie across the valley is built of steel and it is equipped with two shaker screens and two picking belts, the machinery in connection being operated by electricity. There are also two

Ottumwa box-car loaders, worked by steam. The coke ovens at this colliery have been built in close proximity to the tippie, so the distance the slack has to be hauled to the ovens is very short.

**Corbin Coal & Coke Co.'s Mines.**—This company's colliery is on McGillivray creek, the south branch of Michel creek, near the summit of the Rocky mountains. A branch line of railway leaves the C.P.R. Co.'s Crowsnest railway at McGillivray station (formerly The Loop) and follows up the south fork for about fourteen miles to the colliery, which comprises Nos. 1, 3, and 4 mines. Last year coal was mined from Nos. 3 and 4, No. 1 mine having sealed on account of fire burning in it. This year production has also been from Nos. 3 and 4 mines. Of No. 3 mine, known as "the Big Showing," one of the district mine inspectors wrote:

"This is an open pit or surface operation, and is about 1,200 feet higher than the Corbin townsite, or about 6,200 feet above sea-level. It is reached by a standard-gauge switchback railway eight miles in length, owned and operated by the Corbin company. Shay locomotives are used for hauling the railway cars, as the grades are very heavy in places.

"The seam here is several hundred feet thick and is standing practically vertical. There is comparatively little cover on the seam, and this is removed in benches by steam-shovels. It is sometimes necessary to blast the overburden, and this is done by driving several 'coyote' holes in the side of the hill. These holes are then chambered at the back end and loaded with a heavy charge of black powder, as much as 3,000 lb. being in one hole. After blasting, the work of removing the debris is completed by the steam-shovels, leaving a clean face of coal. The coal is then loaded direct into railway cars by the steam-shovels."

**Hosmer Mines.**—The Hosmer mines were opened in coal measures occurring high up the hills to the east of the Elk river, between Fernie and Michel. A tippie of steel construction, with storage-bins for 2,600 tons of coal, 200 tons of rock, and 3,000 tons of slack for the coke-ovens, was erected and 240 beehive coke-ovens having an output capacity of 300 tons of coke a day were built. Altogether the equipment was one of the most complete in the Province, but the coal seams were so broken and disturbed that finally the endeavor to mine the coal was given up by the owners, the Canadian Pacific Railway Co.

#### Princeton and Nicola Valley.

**Princeton Coal & Land Co.'s Colliery.** This property is situated near the town of Princeton, at the junction of the Similkameen and Tulameen rivers. The output of coal in 1916 of nearly 30,000 long tons was the largest the company had made in any year up to that date. This year production is expected to be considerably larger; a recent month's output, working 23 days, was 3,800 tons. Equipment includes a screening plant with a capacity of 500 tons a day.

**Nicola Valley Collieries.**—These are four in number, owned respectively by the Inland Coal & Coke Co., Merritt Collieries, Ltd.; Middlesboro Collieries, Ltd., and Pacific Coast Coal Syndicate. The Merritt Collieries, Ltd. late in 1916 acquired the property known as the Diamond Vale colliery, which had been inoperative about three years. It is not yet a large producer of coal. Neither has the Pacific Coast Coal Syndicate yet made a considerable output.

**The Inland Coal & Coke Co.** operates the Coal Hill colliery. Last year it employed an average of 98 men. In 1913 it employed an average of 177 men and produced 114,000 tons of coal. Since then the yearly out-



put of coal has shown a steady decrease, the use of fuel oil especially in railway locomotives, having adversely affected the market for coal from this district.

**The Middlesboro colliery** comprises Nos. 2, 4, 4 East, and 7 mines. Last year No. 2 mine was not worked. The output in 1916 of only 49,000 tons with 832 men employed compares unfavorably with that of 1911 in which latter year production was 191,290 tons with an average of 487 men. However, the 1916 results were a slight improvement on those of 1915, and it is reported there is still further advance this year. The tippie has appliances for screening and picking coal, a box-car loader is included in the equipment, and power plant and machine shop are equal to the requirements of much larger operations.

#### Vancouver Island Coal Mines.

Vancouver Island coal mines produced in 1916 sixty per cent. of the gross output of coal of the whole Province; for the eight expired months of 1917 for which production statistics are available, the proportion is nearly seventy-four per cent. The suspension of production during three or four months of non-production at Crowsnest mines during the miners' strike doubtless is largely accountable for this increased percentage. Nevertheless there is much activity at Vancouver Island collieries; in fact, it is stated that the Canadian Collieries company alone could give employment to fully one thousand more men were they obtainable, but they are not.

**Canadian Collieries Mines.**—The Canadian Collieries (Dunsmuir) Limited, during 1911 acquired all the colliery interests of the Wellington Colliery Company, Ltd., long known as the Dunsmuir collieries, and has since been operating the Comox and Extension collieries.

The several mines of the Comox colliery are situated near Cumberland, in Comox district of Vancouver Island, distant about seventy miles from Nanaimo. A railway about twenty miles in length connects the various mines with Union Bay, which is the shipping place for these mines.

Mines known as Nos. 4 and 7 slopes and Nos. 5, 6 and 8 shafts, have been operated in recent years, but at the present time Nos. 6 and 8 are idle. The importance of these mines is indicated by the fact that in 1916 their output was nearly one-fifth of the total production of all the coal mines in the Province, while it has probably been even larger this year. Many particulars of plant and equipment may be found in the Annual Report of the Minister of Mines. Summarizing, it may be stated briefly that during recent years large sums of money have been spent in thoroughly modernizing the plant, providing effective screening and sizing facilities for the coal, handling to and on the railway, washing and loading at Union bay, coking the slack, substituting electric for steam power, and to this end establishing an important hydro-electric power generation system, improving the railway and its rolling stock, and in various other ways providing for the considerable expansion of the coal-mining and shipping business of the company.

Extension colliery comprises Nos. 1, 2, 3 and 4 mines, situated about ten miles southwest of Nanaimo. Considerable improvement has been made at this colliery during the last two or three years, development of mines having been pushed and equipment added to. Coal is shipped at Ladysmith, Oyster Bay, where there

is a washery and excellent facilities for loading coal on to vessels of all sizes.

The Canadian Collieries company is opening a new mine south of the old Alexandra mine, near South Wellington. A slope is being driven, to reach the Douglas seam of coal, which has been so productive in other parts of this district.

**Western Fuel Co.'s Mines.**—This company is operating the Nanaimo colliery consisting of No. 1 Shaft (Esplanade), Nanaimo, and connecting mines; also the Reserve Shaft mine, situated about five miles south of Nanaimo, with the shipping docks at which port it has railway connection. The Reserve is a comparatively new mine, having been developed within the last four or five years. While its output of coal is not yet nearly so large as that of the No. 1 Shaft mine, which was closed about 1904; production from 476,800 tons from No 1 in 1916, it will become increasingly productive as the years shall pass.

The Western Fuel Co. has re-opened the Harewood mine, which was closed about 1904; production from this mine is now about 400 tons a day.

**Pacific Coast Coal Mines, Ltd.** This company has about worked out its old mine at South Wellington, and is now concentrating its attention on its Morden mine, opened several years ago, and situated two miles east of the old mine. Production from the Morden colliery in September was about 9,000 tons. The company has extended its shipping docks at Boat Harbor to deep water and has provided modern coal-loading plant; it will be practicable soon to there load very large vessels, and the expectation is that a considerable share of the coal-bunkering business will come to this port.

At Suquash also on the east coast of Vancouver island, near Malcolm island, the company has large and important reserves of coal, the further development of which is planned for the near future.

**Other Collieries.**—The British Columbia Coal Mining Co. has acquired the colliery of the Vancouver-Nanaimo Coal Mining Co., with mine situated about two miles west of Nanaimo, on what is known as the Old Wellington seam. Recently fire in the mine necessitated its being sealed off for a time, but it is expected that production of coal will shortly be resumed.

The Nanoose colliery is working a mine at Nanoose bay, situated about five miles northwest of what is known as North Wellington, which latter was formerly operated by the old Dunsmuir company and known as the Old Wellington seam. Production from this colliery is as yet small.

#### Other Coal Fields.

Coal is known to occur in many other parts of the Province, as yet in most instances without railway connections for transportation purposes. The most important of these fields is that in the neighborhood of the Upper Elk and Fording rivers, in the Rocky mountain region of East Kootenay. There is also coal in the Flathead country, toward the extreme southeastern part of the Province. In country tributary to the Grand Trunk Pacific railway, east of Hazelton district, and, too, in the country about the headwaters of the Skeena river, in what is known as the Groundhog basin, coal measures occur that are stated to promise an important production of coal when conditions shall be favorable for its being mined and shipped. Still other coal occurrences are known, but on most of them little or no development work has been done.

# Coal Mining in Alberta

Alberta has enormous supplies of coal and coal mining in that province is a big industry. There are 289 coal mines in operation, and 8,023 men are employed.

Owing to the exceptional conditions existing at the present time, statistics with reference to coal production in Alberta are being collected and published every quarter, instead of annually as in previous years. The following tables give particulars with reference to the output produced during each quarter of the year 1916, also the production during the first three-quarters of the year 1917.

Lignite—	1916.	1917.
First Quarter .....	695,953	744,700
Second Quarter .....	235,824	227,879
Third Quarter .....	434,936	619,467
Fourth Quarter .....	806,088	.....
Bituminous—		
First Quarter .....	478,249	649,318
Second Quarter .....	573,173	177,579
Third Quarter .....	648,197	671,442
Fourth Quarter .....	635,640	.....
Anthracite—		
First Quarter .....	35,009	37,817
Second Quarter .....	36,052	11,387
Third Quarter .....	35,661	33,643
Fourth Quarter .....	33,822	.....

Mr. John T. Stirling, Chief Inspector of Mines, estimates that the total production for the year 1917 will be approximately 4,700,000 tons, which makes the production in 1917 a little more than the production in 1916, notwithstanding the fact that the output has been interfered with considerably by labor trouble. All the anthracite and bituminous mines in the province and practically all the lignite mines in the Lethbridge and Drumheller districts were idle for practically the whole of the months of April, May and June. The output is still being severely interfered with owing to local strikes in different parts of the province.

The number of men employed in the coal mining industry in Alberta is now 8,023, which shows an increase of 1,096 for the same period 1916. The largest increase of coal production in the province has taken place in the Drumheller field, where the output has increased practically 93 per cent. over the year 1916.

There are now in operation in the province three mine rescue cars and five mine rescue stations. The material for the equipment for a mine rescue station at Mountain Park is now on the ground and it is intended to have the station in operation at this point within the next two months.

Thirty-three new mines have been opened in the province during the present year, making a total of 289 now in operation. Owing to the increased output and the fact that the consumers, as a rule, are stocking coal much earlier than usual this year, it would appear that the Prairie Provinces are fairly well supplied with fuel and, as a matter of fact, are probably in a better condition than they have been for the last five years at this time.

During the nine months ending September 30th, 1917, 2,213,501 tons of coal was imported from the United States through ports in Western Canada, as compared with 2,217,650 tons through the same ports during the same period 1916. This coal is being consumed in the

territory which should be supplied with coal from the Alberta mines.

A considerable portion of the output in the Edmonton district has been obtained by means of what is known as the stripping method. The Cardiff Collieries Ltd., one of the largest producing mines in this district, is making arrangements whereby all the coal in future will be obtained by stripping the surface, by means of a drag line scraper.

In addition to the coal mines already mentioned, two copper mines have been put into operation in the territory west of Banff.

In 1916 there were in operation in Alberta 279 coal mines. The production was 4,648,604 tons coal. There were employed underground 5,536 men. Since the first of the year no less than twenty-seven new mines have been opened, the most important of these being those of the Western Gem Mining Co., Atlas Coal Co., Scranton Coal Co., and Hamilton Coal Co., in the Drumheller district; of the Cadomin Coal Co., in Mountain Park; the Crown Coal Co., Elean; the Edmonton Collieries, Clover Bar; and the Taber Coal Co., at Taber. The Departmental Bulletin giving the figures of coal production for the second quarter (ending June 30th), and also for the half-year of 1917, shows that as compared with production returns for the corresponding period of 1916, the coal output during the first six months of this year has declined to the extent of about two hundred thousand tons, the figures being 2,054,260 tons and 1,858,680 tons respectively. Among recent developments of interest it may be mentioned that sinking is now in progress on the new mine that is being opened by the Edmonton Collieries in the Clover Bar district, that the mining of coal by the stripping process is about to be adopted at the Cardiff Collieries' mine, near Cardiff; and that the North American Collieries' have taken over and are now operating the Red Deer Valley Coal Co.'s mine, near Drumheller, and also the property formerly worked by Marcens L. Hyde, Limited. At this latter mine, by the way, the stripping method of working is employed. At the Regal Collieries, Taber, some important improvements have been completed recently.

## A NEW CABLE TERMINAL.

A new style of outdoor (Type D.O.A.) cable terminal has recently been placed on the market by the Standard Underground Cable Co. of Canada, Limited, Hamilton, Ont. It is known as the Protected Disconnection style. All the copper parts are covered by a porcelain hood, which permits the disconnection of the aerial extension wire even while the circuit is alive.

## MANGANESE ORE FROM BUTTE.

Interest in the mining of manganese in the Butte district, Montana, has been heightened by the shipment from the Emma mine by the Anaconda Copper Mining Co. of five cars of the so-called "pink" manganese ore, mineralogically known as rhodochrosite, a carbonate of manganese, an average car sample of which carried 39 per cent. manganese and less than 5 per cent. silica.



### How to Save Coal for War Purposes

"So much is being said about the shortage of bituminous coal, and the general public realizes so little the important gains in output made by the operators under trying conditions, last summer, over all previous records, that the statement just issued by the United States Geological Survey, Department of the Interior, on production in 1917 compared with 1916 is particularly timely. In commenting on this report, prepared by the statisticians of the Geological Survey, Director Geo. Otis Smith points out that the shortage is not due to the failure of the soft-coal mines to produce more coal than in the past, for the country on September 1 was about a month ahead of last year in output and is expected to finish the year with an increase of 10 per cent. over 1916, the banner year, and of 25 per cent. over 1915.

The tremendous increase in manufacturing and transportation activity this year has created a demand for soft coal in excess of any in the past, an increase in demand that is difficult to measure in terms of tons but that is certainly more than the 10 per cent. by which production has increased. To meet this demand the mines have been producing soft coal at a rate never before equaled.

Talking to a representative gathering of men who are to assist the Fuel Administration in the different states, at their meeting in Washington with Dr. H. A. Garfield, Van H. Manning, director of the U. S. Bureau of Mines, said concerning the necessity of urging the economical use of fuels:

"The economical use of fuel has proved to be no simple problem. The coal, the equipment, and the human variables make hard and fast general rules impossible.

"Americans have been as wasteful of coal as of other resources, largely because coal has been abundant. To many consumers it has seemed hardly worth while to give time and thought to the saving of coal.

"Conditions have suddenly changed. Today it is everybody's business to save coal. Coal is the foundation stone of industry. Without it the production of equipment for war must halt. Transportation facilities must stand still. One man's careless and wasteful use may mean an idle factory or a cold house for his neighbor. With the world looking to us largely for its coal supply, with increased demands at home, with a scarcity of available labor, with overtaxed transportation facilities, the consumer of coal must pause and give serious consideration to the problem which confronts the country.

"If the consumers can be aroused to an intelligent consideration of the burning of coal, they can begin to save ten per cent. of the production (600,000,000) at once. With more effort, through instruction and a moderate remodeling of coal burning equipment, which could all be accomplished during the war, a further considerable saving can be made. The possible coal saving when present practice is compared with the best ideal practice, is very large. If it were possible to supply the need of this country for light, heat and power through the highest type of mechanical devices, and if we could make a skilled coal user out of the average user, we could probably get along with half as much coal as we are now consuming. This ideal is far beyond present realization.

"The immediate problem is a difficult one. We cannot scrap all out-of-date power plants. We must start by doing the best with what we have. We must begin saving coal at once. The problem is personal. It deals with the human element. We must reach the man with the shovel.

"About fifteen million people shovel the twenty per cent. of our coal used for domestic purposes. Only about two hundred and fifty thousand firemen shovel the sixty-odd per cent. of our coal used by power plants and railroads. While we must appeal to the householder to save coal it is vastly more important to reach the fireman through whose hands the larger part of our coal passes.

"The householder must realize that when he throws a shovelful of anthracite coal into his furnace its value is equivalent to half a pound of sugar, or half a loaf of bread, or a pint of milk. He must appreciate that it is worth while to examine his house and to overhaul his heating equipment. Weather strips, double windows, pipe coverings, clean flues and chimneys, and tight fittings in ash-pit, doors, dampers and furnace parts will all pay. Damper control is one of the chief secrets of economical heating. Clean surfaces are most essential, as soot is a poorer conductor of heat than asbestos. Care, attention, and taking pains will be the greatest factors in saving domestic coal.

"The fireman is, however, the biggest single factor to be considered in a campaign to secure the largest saving of coal. Many manufacturers have made a serious mistake in failing to consider the fireman as a skilled worker. Too often he is treated as a roustabout. He is not well instructed nor given proper labor saving devices. As coal increases in price, or becomes difficult to get, the fireman handles more and more of his employer's money. His efficiency means more in dollars and cents. This is an encouraging feature in the situation. It means a better recognition of the importance of the fireman, more efficient work on his part, and a consequent increased saving of coal. The viewpoint is changing. It is no longer cheaper to pay for the coal than to educate the firemen.

"In carrying out a campaign to promote the saving of coal, let the appeal be made to the householder to cut down his consumption in every way possible, but above all, give serious consideration to methods by which a systematic relationship may be established between the office and the fireman. Encourage the manufacturer to take a keener interest in his fuel consumption and to back up his fireman by giving him the best information and equipment available. This problem has two phases—first, to arouse the interest of the manufacturer and his engineer and fireman and to point out the part which they can play in relieving the present crisis in coal supply. Second—to furnish whatever technical information may be desirable and which will be immediately applicable to accomplish the result sought."

### O. E. LEROY KILLED.

Our readers will be sorry to learn of the death of Capt. O. E. Leroy, who was killed in action last week. Capt. Leroy was one of the ablest economic geologists in the service of the Canadian Government, and was a man who had many friends in all parts of the Dominion. He was well liked by his associates and was one of the most popular members of the Canadian Mining Institutes.

## Coal and Coke Production

January to June, 1917.

The Mines Branch of the Department of Mines has received from the principal coal mine operators, returns of their production during the first six months of 1917 on the basis of which the following estimates have been made of the total production during this period.

The record of exports and imports is compiled from the published reports of the Customs Department and for imports represents the quantities of coal entered for consumption.

The production of coke includes only the coke made in bee-hive or by-product ovens and does not include coke made by gas companies in retorts.

Second Quarter 1917.

Province	April.	May.	June.	Total 2nd Quarter.	Total Six Months.
Nova Scotia	489,665	594,104	584,188	1,577,947	3,058,216
New Brunswick	14,876	13,620	13,589	42,085	93,485
Saskatchewan	13,460	18,055	21,516	53,061	139,023
Alberta	210,856	97,328	97,663	405,847	1,763,506
British Columbia	156,884	156,511	151,094	464,489	1,100,190
Production	885,731	789,648	868,050	2,543,429	6,154,420
Imports:					
Bituminous	1,331,449	893,055	1,260,652	3,485,156	6,392,378
Anthracite	347,390	318,782	551,105	1,217,277	2,231,859
Total	1,678,839	1,211,837	1,811,757	4,702,433	8,624,237
Exports	94,665	109,167	120,025	323,857	825,427

## BABBITT METALS.

In the Oct. 27 number of "Hardware and Metals," Mr. W. G. Harris, President of the Canada Metal Companies, has an interesting article on babbitt metals. He has had long experience and writes with authority. His advice to users is as follows:

Bearings to be filled should always be dry and free from oil. Heating the shell and mandrel to from 100 degrees to 150 degrees C. before the babbitt is poured into it tends to prevent blow holes and similar defects, and also prevents the lining from shrinking away from the shell. Babbitt bearings must not be jarred while the metal is solidifying, since any disturbance at this temperature tends to enlargement of the crystals and corresponding brittleness. Pour the babbitt metal at as low a temperature as is consistent with the filling of the moulds. Red hot metal is overheated and has a tendency to form a dense grain. Avoid red hot metal. Stir well before pouring. Keep metal pure and do not mix with others for best results. When peening, strike in the centre, hitting lightly and work to the outside. In pouring have riser and pour down on the shaft. Do not tighten upper half of box hard until bearing is set. Clay mixed with oil, making a putty like mass, is the best agent with which to stop up the ends, riser, and gate, as it will not cause the metal to spit or fly when it comes in contact with it.

The quality of the bearing metal in a machine lengthens its life, and in view of this fact it is surprising that knowledge in regard to bearing metal is not more general.

In the Sydney district probably 60 per cent. of the mine employees are native Nova Scotians, from 10 to 15 per cent. are of non-English-speaking nationalities, chiefly Italians, Frenchmen, Belgians, Germans, Austrians, Russians, and Slavs of various countries. The remainder are persons born in the British Isles, or in Newfoundland; the latter place being an important contributor to the labor supply of Nova Scotia. In Inverness county, and at the mainland collieries, the percentage of Nova Scotians and others of British nationality is greater.

## UNDERGROUND HAULAGE IN NOVA SCOTIA COAL MINES.

Horses are used underground in large numbers in Nova Scotia coal mines, but the tendency is now to avoid their use as much as possible and to substitute mechanical haulage. The horses used average from 4 feet 8 inches to 5 feet 2 inches in height, and cost between \$180 and \$200 each. Mules are not used in Nova Scotia mines. The price of pit horses has doubled within ten years, and suitable animals are very difficult to obtain. For many reasons it may be expected that mechanical haulage will eventually supersede the use of horses underground.

In Nos. 2 and 9 collieries of the Dominion Coal Company, compressed air locomotives are used for haulage in and out along the main roads leading to the pit bot-

tom. The main haulages are mostly operated by engines working on the surface, chiefly steam-driven, but in several recent installations, electrically operated. The auxiliary haulages underground are in one or two instances electrically operated, but are mostly driven by compressed air.

## POWER HAMMERS FOR MINES.

The Mayer Brothers Company, Mankato, Minn., has been making power hammers for 25 years, and is yet able to claim that the first one made is still in use and so far as known none have gone into the scrap heap. The hammers are guaranteed forever against defective material and workmanship. More than 1,000 of these power hammers are used by mining companies in the United States, especially in the coal mines. They are used for general smithing and forging work, which every mining company has to do to a considerable extent. In connection with special dies, also manufactured by Mayer Brothers, they are also used for manufacturing, reshaping and sharpening pick points, chisel bits, puncher picks and other various kinds of mining tools.

## PERSONAL AND GENERAL.

It is understood that the firm of MacKinnon, Holmes & Co., Limited, have recently received from the Imperial authorities a large order for marine work which will keep their plant in operation for many months to come.

Mr. J. B. Tyrrell has returned to Toronto from Newfoundland. He expects to leave shortly for London, Eng.

Mr. E. P. Mathewson will give an address on metal at a public meeting, under the auspices of the Royal Canadian Institute, in the Physics building, University of Toronto, Saturday, Nov. 24th, at 8 p.m.

Several small mines have been opened in the Peace River district, Alberta, and although these mines are operated on a small scale at present, it is probable that with the increased settlement that is taking place in the district north of Edmonton, these mines should be fairly large producers in the near future.



### A Mining Week in Vancouver

Vancouver, B.C., Nov. 5.—This western city has been chosen ground for a mining week, and its advent was heralded by posters and handbills which conveyed to the persons interested that there would be doings at the opening of new premises of Chamber of Mines in the Dominion building. Its new life is largely due to an old member who, after a considerable absence, blew into the city and started to make things hum. As he brought a wife with him, ladies had to be taken into account, and consequently after much trepidation the committee announced that "Ladies will serve refreshments from 4 to 6 p.m." It was assumed that the men would need some refreshment and encouragement after their arduous labors at the opening ceremony.

The program covered five days of the week, and commenced with a luncheon. Hon. Martin Burrell, Dominion Minister of Mines, ably fulfilled the duties of principal speaker. As this luncheon clashed with that of the Canadian Club a small attendance was feared, but 116 interested men were present. Mr. Nicol Thompson was in the chair. No particular secrets were divulged.

In the afternoon the B. C. Minister of Mines came to the fore, supported by Messrs. Walters and Willson. Mr. Thompson was again in the chair and there was a very encouraging attendance of citizens. Mr. Sloan specially referred to the importance of the iron industry and was evidently fully alive to the importance of its introduction. He was well satisfied with the Chamber of Mines premises and thought that the chamber could not fail to be of great benefit to the Province, which possessed such unbounded wealth in its rocks. Many ladies were present and after the speechifying they, headed by Mrs. Clabon, Campbell-Johnson, and Beech, served ample supplies of the confectionary art, and refreshing cups of tea and coffee. This refreshment business added a very enjoyable feature to the day's proceedings.

On Tuesday afternoon Prof. Turnbull gave a most lucid explanation and practical demonstration of the oil flotation process for concentrating ores. All the experiments worked out successfully. Many ladies were present at this lecture, and in fact at all the lectures during the week. In the evening a crowded audience faced Professor Hodge, who lectured on "Ore Bodies and How to Recognize Them." The lecture was illustrated by a large number of lantern slides.

On Wednesday afternoon, Mr. Dudley Michel of the B. C. Department of Mines exhibited and described the latest form of apparatus designed for use in the rescue of miners after disasters and fighting underground fires. He showed also a new form of pulmotor for the resuscitation of men who have been gassed. In the rescue apparatus pure oxygen gas is used; but in the pulmotor air and oxygen.

In the evening Judge Howey charmed a crowded audience with his history and personal experiences on the Cariboo Trail, illustrated with an ample lot of excellent lantern slides. As most people know, Judge Howey is the best living authority on this period of B. C. history.

On Thursday Professor J. G. Davidson gave a very interesting lecture and demonstration on "Smelter

Smoke and Coal Smoke," and also some lantern views to assist his descriptions. The deposition of tar fog was the principal point.

In the evening Mr. James Ashworth lectured on "Coal Economies" and having been slated to give an illustration on coal mining, he used several of his lantern slides showing mine rescue apparatus and some unique pictures of a colliery explosion, also ancient miners' safety lamps.

Mr. Ashworth was followed the same evening by Mr. A. E. Haggan, who gave a mining history of B. C. and treated a dry subject in a pleasant and instructive manner.

On Friday an interested crowd of boys from the High School, with their parents and others, gathered to look around and hear short addresses from Messrs. Cunliffe, Sharp, Eldridge, Bland, Clabon and Ashworth, who also showed them a series of lantern slides. Thus came to an end a week which was described by one daily paper a "huge success."—J. A.

### OBITUARY.

#### Geo. T. Holloway.

A cablegram received at the Department of Lands, Forests and Mines last week contained the news of the death of Mr. George T. Holloway in London on the 24th ultimo. Mr. Holloway was the nominee of the British Government on the Royal Ontario Nickel Commission, and was appointed chairman of that body, the other members of which were Dr. W. G. Miller, McGregor Young, K.C., and T. W. Gibson. The report of the Commission was issued last spring, and is regarded as a complete treatise on nickel.

Mr. Holloway was an eminent metallurgist, with long experience in the investigation of the properties of metals, and was head of George T. Holloway & Company, Limited, at 13 Emmett street, Limehouse, London, England. He was an associate of the Royal College of Science, London, Vice-President of the Institution of Mining and Metallurgy, and was also connected with the Institute of Metals, and a member of the Mineral Resources Committee of the Imperial Institute.

The work of the Commission occupied about a year and a half, from September, 1915, to March, 1917, and after its completion Mr. Holloway returned to England. He was then, in May last, in poor health, and grew steadily weaker until the end. Mr. Holloway was a man of much personal charm and made many friends during his sojourn in Canada.

#### Tommy Irving.

The death of Lieut.-Col. T. C. Irving, Jr., D.S.O., he having been killed while "carrying on" in France the other day, was received with deep regret by a large body of Canadians. It is not too much to say that Lt.-Col. Irving was one of the most popular club and business men in Toronto. The eldest son of T. C. Irving, "Tommy" Irving, Jr., was born in Toronto in 1879. He chose engineering as a profession and took his course at Toronto and McGill Universities. At Toronto University he took a keen interest in sport and was manager of the third Rugby team in 1900.

In business life he was originally associated with F. H. Clergue as chief assistant, and was identified particularly with the development of the Helen Mine and the building of the Algoma Central Railway, which now forms part of the Lake Superior Corporation. Latterly he was vice-president of Robt. W. Hunt & Co., Ltd.

### OVER-PRODUCTION OF LEAD.

Producers of lead have been seeking a level at which they could induce consumers to take some of the accumulation off their hands. With the price now lodged at 5½ cents a pound that level has about been reached in the belief of large trade interests. This new low figure represents a drop of 7 cents a pound from the highest level at which lead ever sold—12½ cents a pound.

Inflated prices, accompanied by over-production and now accumulation of the metal, tell the story of the lead market in few words. Lead never should have gone above nine cents a pound, but when it advanced to 12½ cents under the stimulus of rumors that the United States Government was to buy a tonnage equal to one-half of the 1916 output, nothing more was needed to urge producers, large and small, to expand their operations to the limit.

Similar conditions exist in spelter with demand practically at a standstill. Both these metals will now be governed by the law of supply and demand and with prices at their present levels the need for committees to work in behalf of government purchase has disappeared.

A rather unpalatable flavor has been left in the mouths of some of the lead producers by action of the government representatives who had agreed to pay for certain tonnages a straight price of eight cents a pound. Before all of the deliveries had been completed under these arrangements the market price had dropped below the eight-cent level and has since continued to decline. The government agencies now state that they will pay no more than market prices for their requirements.

The over-production and accumulation of spelter had been relieved to some extent by curtailment of output. This curtailment of late has been quite extensive and effective.—Boston News Bureau.

### THE LEAD SITUATION IN B. C.

Victoria, B.C., Oct. 30.—Overshadowing every other interest in the British Columbia mining world in the past week has been the lead situation in the Kootenays, which was fully dealt with in the Victoria Daily Times when the announcement of the acceptable Federal action was published.

S. G. Blaylock, assistant general manager of the Consolidated Company, explained the situation on Wednesday to the operators in Nelson in part as follows:

"The very high prices of lead which were occasioned by the tremendous demand for munitions purposes, had restricted the use of lead for other purposes. As a matter of fact, any form of lead manufactured product became almost prohibitive in price to the consumer. Our sales outside of munition lead were insignificant. Besides the natural restriction due to the price, was the fact that there was considerable price cutting in Eastern Canada by American producers. I must say that we were met with absolute fairness by every mine owner present at that meeting, and we still felt hopeful that the munition board would see their way clear to take our lead at the price we paid for it.

"Since then, there have been negotiations with the board and we now find that the utmost that it will agree to is to take 1,200 tons of lead per month until February 28, 1918. After that there is no assurance whatever of any market for lead in Canada, except from the manufacturers for other purposes than munitions and this demand is very light.

The restricted orders of the munitions board and the fact that they are not going to give us the price that we have paid for all of the lead which we have already bought in anticipation of their requirements and have in stock, is liable to be a very serious loss to the smelter, more particularly should the price of lead remain down or 'slump' still further. These receipts will all be paid for—much of them on the old basis of the munitions board purchases of St. Louis, price plus freight—long before we could market it at the rate of 1,200 tons per month.

"The solution of the present difficulty is as stated above: First, to reduce our stock to a proper operating basis for the limited market in Canada, and at the same time to use every effort to market our lead outside of Canada, in China and Japan, if we can overcome the Australian competition and secure space on the steamers; or even selling the lead in the United States. In order that this may be done, it would seem necessary to make an absolute pool of all of the lead so that allowing the usual 60 days for reducing the ore to fine metal, sales would be shared pro rata at whatever is obtained between all producers and only to the extent that sales are actually made. In other words, to hold the lead for account of the shipper until it is sold.

"From the above it ought to be clear that the reason we are accepting lead ore shipments carrying less than 4 per cent. zinc is that they may be used to dilute the high zinc ores; in other words, to use Canadian ores as much as possible, instead of foreign ores, but, unfortunately, the acceptance of these ores involves an addition to the amount of lead to be sold, and it seems possible that the extra metallurgical losses might be less than what we would lose on account of market conditions.

"It will be necessary, therefore, if we are to continue to receive even these ores, to modify the settlement scheme on such ores so that final settlement will not be made until such time as we have marketed first, the metal on hand at present and then the product from these ores."

In connection with the above statement from Mr. Blaylock it will be recalled that on the following day, Hon. William Sloan was able to inform the convention by wire to the effect that, subsequent to the personal representations of Premier Brewster at the national capital, the Imperial Munitions Board had agreed to place an order for 6,000 tons of lead with the smelter. It was estimated then that the product of the smelter would be taken care of until March next.

In addition to the order so placed the convention was also informed that the Federal Government would make immediate arrangements for the removal of the embargo prohibiting the export of silver, lead and zinc to the United States. By this latter procedure it is believed that a wider market still for British Columbia metals will be found.

The subject of remission of the duty on similar metals going from Canada to the United States has also been taken up with Ottawa and while the successful termination of these negotiations is at the moment problematical, the increased demand for the ores in question in the manufacture of munitions in the republic to the south may be an important factor in this regard. With such an arrangement consummated there would be an equal field for British Columbia with commensurate extension of business on this side of the international boundary.—Victoria Daily Times.



## SPECIAL CORRESPONDENCE

## BRITISH COLUMBIA.

In the account of Coal Mining in British Columbia, sent earlier, it was stated that the production of coal in the Province during eight months to the end of August, 1917, had been 1,536,000 long tons. Since then the figures for September have been received, namely, 195,485 tons, making the total for nine months of the year 1,731,485 long tons. This represents the gross output, that is, including the coal used in making coke. The average monthly production has therefore been 192,387 tons. The total for the whole of the year 1916 was 2,485,580 tons, or an average of 207,132 tons. It would seem unlikely that the current year's gross production of coal will be as large as that of last year, for to make it so the output for the last three months of the year would have to average 251,367 tons a month, or about 59,000 tons a month more than the average for the expired nine months of the year.

The following information relative to a new coal-mining property on Vancouver island was published recently in a local newspaper: "At Nanoose bay, on the eastern coast of Vancouver island, an embryo city has come into being. There is being built a new mining town that some day may become a city of importance in the Province. The name of the new town is Grant, and at the present time it consists of buildings connected with a coal mine owned by the Nanoose Collieries Co. New houses are being constructed for the employees of the mine, and a school-house is in course of erection. When the construction work shall be completed there will be quite a flourishing little town at the bay, which is twelve miles from Nanaimo. The Grant mine is at present in a fine state of development. One hundred and fifty tons of coal is being produced daily, and it is expected that the output will be increased considerably as soon as the new workings shall be opened. The coal is being shipped on scows to Seattle, Washington."

The Fernie Free Press, published in the largest town in the Crowsnest district of British Columbia, states that the Commission investigating the cost of living has been visiting the various towns in the district, and while the evidence taken shows that there has been some increase in certain articles since last April, on the whole there has been very little change. The increased cost has been largely in dry goods. The Commission is expected to make its report very shortly, when, if the increase shall warrant it, the coal-miners' wages will be advanced sufficiently to cover the difference.

The Canadian Collieries (Dunsmuir) Limited, a short time ago, built 170 more coke-ovens at Union bay, Vancouver island, making the total number of ovens there 300. Owing to a shortage of labor, however, it is unable to supply sufficient coal to keep all those ovens in operation, with the result that about 200 are in use making coke, and the remaining 100 are at present unused. It is stated that the company could give employment to fully one thousand more men at its coal mines on Vancouver island if the men could be obtained, but, as they cannot, the supply of coal is short accordingly.

In its account of the official opening of the Vancouver Chamber of Mines, on Oct. 29, the Vancouver, B.C., Daily Province stated that "Mr. Nicol Thompson, of Vancouver, mentioned that the previous week, as advisor to the Fuel Controller, he made an inspection

of the Vancouver Island coal mines, travelling for three miles under the Gulf of Georgia in visiting the various coal seams. Labor conditions in the mines were improving and the output for October would be considerably above that for September. The mines at Nanaimo, for instance, could employ at least another one thousand men and that without increasing overhead expenses to any marked extent. With more men there would be more production at a lower cost per ton. The present mine managers are doing what they can to increase production of coal, and Mr. Thompson does not expect any shortage this winter of domestic coal, although it is possible that conditions may be somewhat different with regard to steam coal for which there is an abnormal demand on account of the Admiralty needs."

A statement of the receipts and expenditures up to October 20, in connection with the Coal Creek Colliery Explosion Fund, published recently in the Fernie B.C., Free Press, shows total receipts to date to have been \$20,042.15, and disbursements \$3,003.94, leaving a balance at credit in the bank of \$17,038.21. This fund has been raised for the relief of dependents of the thirty-four men who lost their lives in an explosion that occurred last April in one of the Coal Creek mines of the Crow's Nest Pass Coal Co., and of other sufferers from that disaster. Included in the total was an amount of \$10,000 contributed by the Dominion Government.

The Vancouver Daily Province states that, "at the request of the Dominion Advisory Council of Scientific and Industrial Research, Dr. J. G. Davidson, head of the Department of Physics at the University of British Columbia, will soon leave Vancouver for Ottawa to superintend the installation of a by-product coke oven plant in Eastern Canada. He will be away from British Columbia several months. Dr. Davidson stated that for three years he had experimented with the application of an electrical method of cleaning smoke and dust from gases, and extracting smoke from coal gas in gas plants and by-product ovens. This work had proved satisfactory to the council, and an appropriation had been made for the installation of the process on a bank of by-product ovens. The object is to eliminate in new plants much of the machinery used in the older ones. Dr. Davidson pointed out that the importance of coal tar, on account of its derivatives, benzol and toluol, had been realized by the United States Government in its war preparations to such an extent that manufacturers of machinery had been asked to give precedence to making equipment for by-product ovens."

## NORTHERN ONTARIO.

## Preston.

The Preston property, which at one time was under option to the Preston East Dome mining company, has been taken under option by the Hayden Mining Company interests. This property comprises forty acres and is adjacent to the Dome Mines. A few years ago a shaft was driven to a depth of fifty feet and a couple of cars of ore were shipped. Sampling will begin at once and it is expected development will soon be under way.

## Dome.

A new innovation by the directorate of the Dome Mining Company is the semi-annual report, the first of which was received by shareholders recently, covering operation of the mine for a period of six months

ending on the 30th of September. The gross income realized by the company was \$701,810. The total operating costs for the half year amounted to \$524,575, thus leaving net earnings of \$167,234. This increased the surplus of the company to \$864,285. However, from this amount there was deducted \$141,164 for depreciation of plant; \$27,415 for war taxes and \$100,000 has been paid in dividends, leaving a surplus of \$595,706. This shows clearly that production operations at the Dome mines are not being profitably carried on at the present time. This unfavorable situation is wholly attributable to the scarcity of labor and the high cost of material. However, when the tremendous ore reserves are taken into consideration this feature of the report should not be considered at all alarming. It has recently been reported that the company intend sinking a shaft on the property to the depth of 1,500 ft. Ore reserves in the last estimate given by the company did not figure on anything below the 600-ft. level.

#### Hollinger.

The Hollinger Mining Company is about prepared to try out its new addition to the mill which increases the capacity of this plant by 1,000 tons per day. This brings the possible daily production to a little over \$25,000 per day or about \$9,000,000 per year. That it was possible to make this increase in milling equipment with labor conditions which prevail at the present time, is greatly to the credit of this company. Some idea of the immensity of the Hollinger mine may be gleaned from the fact that, were sufficient labor available, the Hollinger Consolidated could be turning out upwards of one and one-half tons of solid gold every thirty days, or over one thousand dollars per hour.

#### Schumacher.

With the installation of a little extra crushing equipment at the Schumacher mill the tonnage treated could easily be brought up to 200 tons per day. The daily average being treated at the present time is about 180 tons per day and the mill heads are not far short of seven dollars per ton, while operating costs are being maintained around four dollars per ton. Conditions at the Schumacher at the present time are the best in the history of this company. Recovery is approximating \$35,000 per month or \$420,000 per annum.

#### Newray.

The Newray mining company's property, now that it has been optioned to the Crown Reserve mining company, will in all probability receive the development necessary to prove it. The operations at this mine will now be under the direction of Mr. Summerhayes of the Porcupine Crown Mines. At one time during the history of this company it had the earmarks of being a winner and at that time was in a position to pay about \$120,000 in dividends. The developments in future at this mine will be watched with more than usual interest.

#### Dome Lake.

Development work at the Dome Lake Mines during the past six months has been exceedingly encouraging and the company have developed ore of an estimated value of \$82,008. The grade of ore developed averages around \$9.03 to the ton. In figuring these ore reserves the results of considerable diamond drilling

has not been taken into account. It is estimated that when the mill additions now being installed are completed the property will be on a profit-producing basis. The report issued is very conservative, but at the same time gives much promise for the future of the company.

#### Porcupine V. N. T.

Similar conditions are being met with on the 600-ft. level of the Porcupine V. N. T. property as were encountered on the McIntyre, and other properties in the immediate neighborhood. The vein at this depth has not only widened out considerably, but also contains a higher grade of ore. It has been determined on adjoining properties that values generally have increased with depth and a diamond drill hole on the McIntyre to a depth of over a quarter of a mile demonstrated ore of a better average value than that already developed throughout the mine, which ranges around \$10 to the ton.

#### Coniagas.

A contract has been let for the sinking of the shaft on the Ankerite property at Porcupine to a depth of 500 ft. This shaft will be of the three-compartment type and will also be used to develop the Maidens-McDonald property, which is also owned by the Coniagas mining company of Cobalt. Considerable ore of a commercial grade has been developed on the Ankerite and one of the finest mining plants for its size in the camp has been installed.

#### Keora.

The Keora property in Whitney Township is about to be diamond drilled again. A contract has been let and the work will be commenced at once. This will be the second diamond drilling programme to be carried out on this property.

#### Kirkland Lake.

Development work at the Kirkland Lake Gold is going ahead rapidly and at the present time drifting is progressing on four different levels. At the 400-ft. level drifting has been carried on for a distance of approximately 700 ft. from the shaft and all but about 60 ft. of this drift is in ore. The estimate of ore already broken down and in sight at this property is placed at three-quarters of a million dollars. It is fully expected that by the time the new 150-ton mill is in readiness for operation over a million dollars in ore will have been developed. The recent cutting of the westward continuation of the Kirkland Lake Gold vein on the Elliott-Kirkland is almost conclusive evidence that this auriferous zone crosses the full width of the Kirkland Lake gold which is about one quarter of a mile. It may now be said definitely that the auriferous zone of the Kirkland Lake camp extends from the Tough Oakes to the Elliott Kirkland, both properties inclusive.

#### Teck-Hughes.

With a return to pre-war conditions it seems highly probable that Teck-Hughes will be in line for an enlargement of the mill. A winze has been sunk from the 400 to the 600 ft. level of the property and a station is being cut preparatory to driving a cross-cut to a point directly beneath the main shaft when a raise will be put up to connect these workings. The Teck-Hughes mill report for September shows a running time of 60.8 per cent. of total and 1,028 tons treated with an average mill head of \$7.93 per ton.



### **Elliott-Kirkland.**

At the Elliott-Kirkland property arrangements are being made to sink the shaft to the 500-ft. level. Drifting is being carried on at the 300-ft. level both east and west. The crosscut which encountered this vein is also being carried on to the contact to determine whether or not any parallel orebodies exist.

### **Canadian Kirkland.**

The find of visible gold recently made on the Canadian Kirkland property is perhaps the most important find yet made on this property. The vein in which this gold occurs is approximately sixteen feet in width and is highly mineralized. Another vein of much promise about twelve feet in width has also been opened up on this property and a shaft sunk to a depth of about thirty-five feet. Across the width of the shaft at this depth the values are said to average about seven dollars to the ton. This property together with the Hutton-Kirkland and the Ontario-Kirkland comprise the principal properties of the south auriferous zone of the growing Kirkland Lake camp. Canadian Kirkland is looked upon with a good deal of favor by mining men of the Kirkland Lake camp.

### **Minaker-Kirkland.**

A new vein in which the ore is said to assay comparatively high has been discovered on the Minaker-Kirkland property. The vein so far is about four feet in width and crosses the north-west corner of the Minaker-Kirkland from the Lake Shore to the Kirkland Porphyry. The vein is heavily mineralized and a little visible gold occurs. This is perhaps the most important discovery to date on this property.

### **Hurricaneaw.**

A number of prospectors have returned to Timmins for the winter from the Hurricaneaw district and have fetched with them some promising samples of gold from a number of claims in this district. A number of test pits have been sunk on claims in this district during the past summer and fall and fairly encouraging results have been encountered.

### **Lake Shore.**

The new mill building for the Lake Shore mill is almost completed and a good deal of the machinery for the 80-ton plant is already on the ground, and installation will commence immediately. It is expected the mill will be in operation early in the coming year.

### **Gowganda.**

A company is being formed to work on claim No. M. R. 1702, township of Nirol, in the Gowganda Mining District. This claim is near Leroy Lake and has been reported on favorably by Mr. Charles Spearman. A vein about six inches in width has been opened up and considerable silver encountered. The composition of the vein is calcite and in places the values run exceptionally high. The formation is diabase and basalt.

Satisfactory progress is reported by a number of mining companies of Cobalt which have entered the Gowganda district and are sampling properties. During the past two weeks the La Rose Mining Company and the Mining Corporation of Canada have both interested themselves in properties in this district, and a number of mines which have not operated for some time are being opened up again, and will undergo further development.

### **Corkill.**

A discovery of silver is reported to have been made in the township of Corkill in the Gowganda mining

division, about fifteen or twenty miles south-west of Elk Lake. The discovery was first reported to have been made in Wallis township, which adjoins Corkill, but it has been definitely established that it is Corkill near the boundary of Wallis.

### **South Bay Power.**

The assets of the South Bay Power Company have passed into the hands of the receiver. This company was organized about a year ago to develop a water-power at Hanging Stone Falls, where it was thought 1,500 h.p. could be developed at a cost of about \$250,000. Work was energetically pushed last winter, but in the spring operations were suspended, to be resumed in the summer, it was announced, and the present report of the failure of the company was received with considerable surprise.

### **Rickard Township Claims Optioned.**

The Mining Corporation of Canada has taken an option on the claims on which the sensational gold discovery was recently made in the township of Rickard. The ultimate price to be paid for the property is said to be the largest since the famous Timmins-Hollinger deal in 1909, and is said to be in the neighborhood of \$350,000. The main vein on the property ranges from twenty to more than forty feet in width and is composed of quartz in which plentiful sprinklings of free gold occur. There are also a number of smaller veins on the property and from surface indications it would appear as if the proposition would be a big one. The gold on this property was accidentally discovered by two Swedes who were cruising for pulpwood in the district and the comparatively short time elapsing from time of discovery until optioning of the property to one of Cobalt's biggest mining companies demonstrated quite plainly the possibilities there are for the prospector in the unexplored parts of the northland, within very easy reach of the railway.

### **Discovery in Bernhardt.**

A promising discovery of native silver has been made in the township of Bernhardt, a few miles north from Kirkland Lake. A test pit is said to have been put down on a six-inch vein and at a depth of a few feet it is said to have opened out to a width of two feet and contains very encouraging silver values.

### **Alexandra.**

The Alexandra mining company's property at Cobalt has been acquired by the Mining Corporation of Canada and work has already commenced. This property consists of twenty acres and is located between the Savage property of the McKinley-Darragh-Savage and the old Bailey Cobalt mining company's property. Considerable work has been done previously on this property consisting of shaft sinking and diamond drilling, and a number of promising veins were opened up.

### **Importance of Silver Industry.**

The Cobalt silver mines are producing silver at the rate of approximately \$60,000 per every twenty-four hours, or at the rate of \$2,496 every sixty minutes, night and day, which in solid bullion amounts to two and one-half tons per day or nine hundred tons annually, which would require a train of thirty cars carrying thirty tons each to transport this pure silver. The payroll is \$4,500,000 per year and supplies to the amount of \$3,000,000 are purchased, making a total expenditure of \$7,500,000. The importance of the silver mining industry to the province of Ontario and Dominion of Canada is apparent.

# ONTARIO'S PRODUCTION OF METALS.

The report of the Bureau of Mines shows the following output of the various minerals and the value with comparisons:

	Quantity. Nine Months.	—Values— Nine Months.	
	1917.	1916.	1917.
Gold, ozs. ....	343,490	\$7,513,734	\$6,754,535
Silver, ozs. ....	15,236,002	9,750,040	12,001,875
Cobalt (metallic), lbs. ....	295,866	146,467	433,739
Nickel (metallic), lbs. ....	166,921	7,618	67,499
Nickel (oxide), lbs. ....	10,831	6,381	3,025
Cobalt (oxide), lbs. ....	276,769	231,947	323,162
Other cobalt and nickel com- pounds, lbs. ....	276,217	22,890	30,025
Molybdenite, lbs. ....	65,827	15,845	83,550
Copper ore, tons ....	2,658	21,685	33,419
Nickel in matte, tons....	31,064	15,523,000	15,532,000
Copper in matte, tons....	15,928	6,285,930	6,371,200
*Iron ore (exported), tons.	98,757	.....	412,401
*Pig iron from domestic ore, tons ....	48,820	.....	936,118
*Lead, tons ....	540	.....	136,948
Total. ....			\$43,119,496

\*1916 figures are not available for the last three items.

## Markets

### NEW YORK MARKETS.

Connellsville Coke—Spot or contract \*\$6.00.

\* Fixed under Lever Act.

Straits tin, spot, f.o.b., nominal, 70.00 cents.

Copper (Government price), 23.50 cents.

Prime Lac, no market.

Electrolytic, no market.

Casting, no market.

Lead, Trust price, 6.25 cents.

Lead, outside, nominal, 6.25 to 6.50 cents.

Spelter, prompt western shipment, 7.67½ cents.

Antimony—Chinese and Japanese, nominal, 14.00 cents.

Aluminum, nominal—

No. 1 Virgin 98-99 per cent., 35.00 to 37.00 cents.

Pure 98-99 per cent. remelt, 33.00 to 35.00 cents.

No. 12 alloy remelt, 25.00 to 27.00 cents.

Powdered aluminum, 75.00 to 85.00 cents.

Metallic magnesium—99 per cent. plus, \$2.00 to \$2.50.

Nickel—Shot and ingot, 50.00 cents.

Electrolytic, 55.00 cents.

Cadmium, nominal, \$1.45 to \$1.50

Palladium, \$115.00.

Quicksilver (Nov. shipment from California), \$100.00

Platinum—Pure, \$105.00

10 per cent. Iridium, \$111.00

Cobalt (metallic), \$2.70

Tungsten—

Wolframite, \$23.00 to \$25.00

Scheelite, \$26.00

Gravel Fluorspar: f.o.b. mine—

Prompt, \$28.00 to \$30.00

Contract, year 1918, \$25.00

Silver (official), 86½ cent.

Metal Products.—Following quotations represent mill prices and are strictly nominal except in the case of lead sheets and sheet zinc:

Sheet Copper—

Hot rolled, \*35.00 to 37.00 cents.

Cold rolled, \*36.00 to 38.00 cents.

(Shipments from stock 2c per pound extra.)

Copper bottoms, \*49.00 cents.

Copper in rods (round), \*38.00 cents.

(Square and rectangular), \*39.00 cents.

Copper wire, nominal, Nov., 30.00 to 31.00 cents.

Copper wire, Dec., 28.00 to 29.00 cents.

High brass—

Sheets, \*30.25 to 32.25 cents.

Wire and light rods, \*30.25 to 32.25.

Heavy rods, \*27.25 to 29.25 cents.

Low brass—sheet, wire and rods, \*36.75 cents.

Tubing—

Brazed bronze, \*48.25 to 48.50 cents.

Brazed brass, \*43.75 to 44.75 cents.

Seamless copper, \*41.50 to 44.50 cents.

Seamless brass, \*38.00 to 42.00 cents.

Seamless bronze, \*52.00 cents.

Full lead sheets, 11.75 cents.

Cut lead sheets, 12.00 cents.

Sheet zinc, f.o.b., smelter, 19.00 cents.

\*For delivery at mill convenience.

### TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.

Cobalt oxide, grey, \$1.65 per lb.

Cobalt metal, \$2.25 per lb.

Nickel metal, 45 to 50 cents per lb.

White arsenic, 15 cents per lb.

Nov. 12, 1917—(Quotations from Canada Metal Co., Toronto)

Spelter, 10½ cents per lb.

Lead, 9 cents per lb.

Tin, 65 cents per lb.

Antimony, 16 cents per lb.

Copper, casting, 34 cents per lb.

Electrolytic, 34 cents per lb.

Ingot brass, yellow, 20 cents; red, 25½ cents per lb.

Nov. 12, 1917—(Quotations from Elias Rogers Co., Toronto)

Coal, anthracite, \$9.50 per ton.

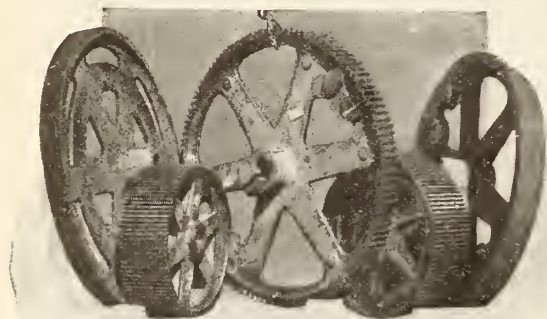
Coal, bituminous, nominal, \$9.00 per ton.

### SILVER PRICES.

		New York. cents.	London pence.
October	20	83½	42½
	22	83	42½
	23	82½	41½
	24	82½	41½
	25	82½	41½
	26	82½	41½
	27	82½	41½
	29	81½	41
	30	80	40
	31	80	40
November	1	89	40½
	2	88½	40½
	3	88½	41
	6	88½	41
	7	89	41



# Cut Gears for Mining Machinery



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Van Horne Street, Toronto

## Clients Requiring Copper Ores

associated with tin, lead or zinc for smelting purposes, SEEK INFORMATION CONCERNING MINES OR MINING DISTRICTS producing such material.

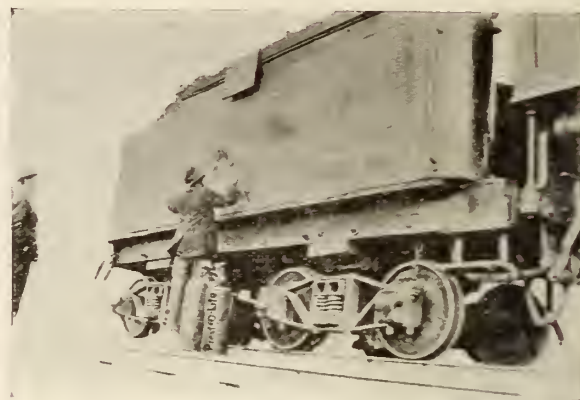
They are prepared to acquire a going concern or would assist in the development of promising prospects, by arrangement after investigation and on the receipt of reports and samples with full information re finance, means of transport from the mines to the Coast and the cost of shipping the products in normal times to England.

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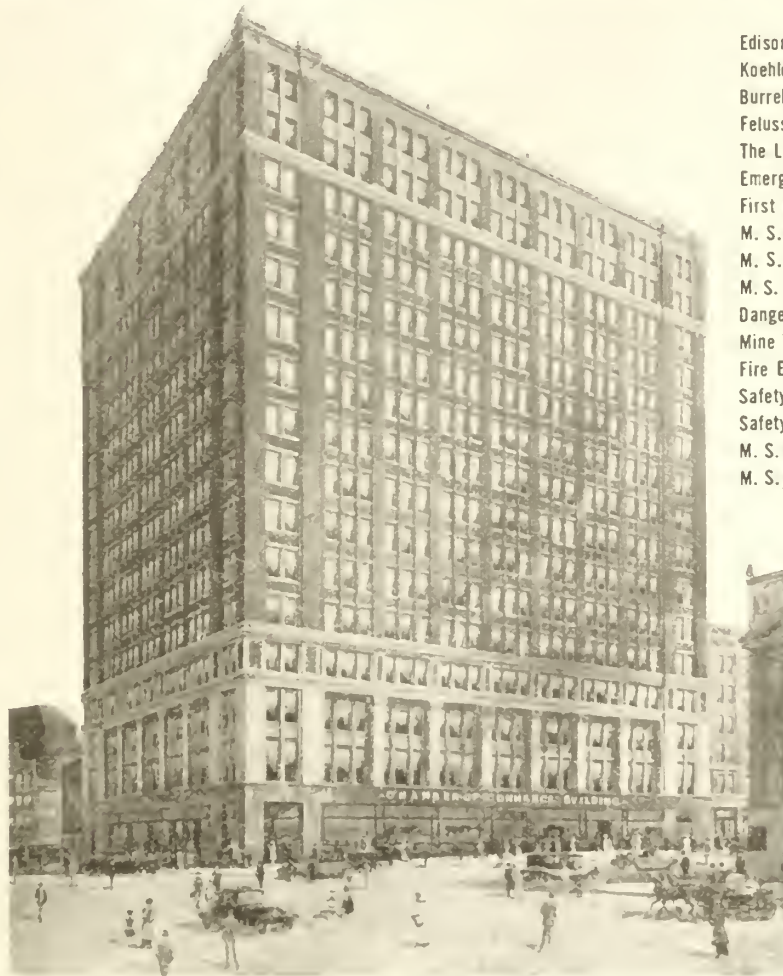
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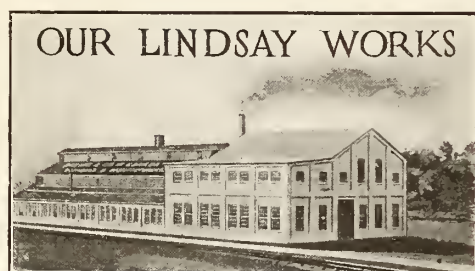
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## COAL CRUSHING ROLLS

The crushing of coal is most satisfactorily done by means of rolls with **pointed teeth** or with **corrugations**. The main rolls, which are used for the preliminary reduction, are almost invariably of the pointed tooth type. We are prepared to furnish coal crushing rolls with inserted steel teeth or those with teeth cast on segments which are bolted to the roll bodies.

The reduction of run-of-mine bituminous coal down to three-eighths inch size is generally done by means of a set of **crushing rolls** with **pointed teeth** and a **disintegrator**.

The rolls used in our **disintegrator** are grooved their entire length, and are operated at a differential speed. The differential effect produces both a crushing and a tearing action on the small lumps of coal, and results in a finer reduction than could be obtained with similar rolls operated at the same speed.

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The Minister of Finance offers for Public Subscription

# Canada's Victory Loan

Issue of

## \$150,000,000. 5½ % Gold Bonds

Bearing interest from December 1st, 1917, and offered in three maturities, the choice of which is optional with the subscribers, as follows:

5 year Bonds due December 1st, 1922  
10 year Bonds due December 1st, 1927  
20 year Bonds due December 1st, 1937

This Loan is authorized under Act of the Parliament of Canada, and both principal and interest are a charge upon the Consolidated Revenue Fund.

The amount of this issue is \$150,000,000, exclusive of the amount (if any) paid for by the surrender of bonds of previous issues. The Minister of Finance, however, reserves the right to allot the whole or any part of the amount subscribed in excess of \$150,000,000.

**The Proceeds of this Loan will be used for War purposes only, and will be spent wholly in Canada.**  
**Principal and Interest payable in Gold**  
**Denominations: \$50, \$100, \$500 and \$1,000**

Subscriptions must be in sums of \$50 or multiples thereof.

Principal payable without charge at the office of the Minister of Finance and Receiver General at Ottawa, or at the Office of the Assistant-Receiver General at Halifax, St. John, Charlottetown, Montreal, Toronto, Winnipeg, Regina, Calgary and Victoria.

Interest payable without charge, half-yearly, June 1st and December 1st, at any branch in Canada of any Chartered Bank.

### Bearer or Registered Bonds

Bonds may be registered as to principal or as to principal and interest

Scrip certificates, non-negotiable, or payable to bearer, in accordance with the choice of the applicant for registered or bearer bonds, will be issued after allotment in exchange for provisional receipts. When these scrip certificates have been paid in full, and payment endorsed thereon by the bank receiving the money, they may be exchanged for bonds, when prepared, with coupons attached, payable to bearer, or registered as to principal, or for fully registered bonds when prepared, without coupons, in accordance with the application.

Delivery of interim certificates and of definitive bonds will be made through the Chartered Banks.

Bearer bonds with coupons will be issued in denominations of \$50, \$100, \$500, and \$1,000, and may be registered as to principal only. Fully registered bonds, the interest on which is paid direct to the owner by Government cheque, will be issued in denominations of \$1,000, \$5,000 or any authorized multiple of \$5,000.

Subject to the payment of 25 cents for each new bond issued, holders of fully registered bonds without coupons, will have the right to convert into bonds of the denomination of \$1,000 with coupons, and holders of bonds with coupons will have the right to convert into fully registered bonds of authorized denominations without coupons, at any time, on application to the Minister of Finance.

### Surrender of Bonds

Holders of Dominion of Canada Debenture Stock, due October 1st, 1919, and of bonds of the three preceding Dominion of Canada War Loan Issues, have the privilege of surrendering their bonds in part payment for subscriptions to bonds of this issue, under the following conditions:—

Debenture Stock, due October 1st, 1919, at Par and Accrued Interest.

War Loan Bonds, due December 1st, 1925, at 97½ and Accrued Interest.

(The above will be accepted in part payment for bonds of any of the three maturities of this issue.)

War Loan Bonds, due October 1st, 1931, at 97½ and Accrued Interest.

War Loan Bonds, due March 1st, 1937, at 96 and Accrued Interest.

(These will be accepted in part payment for bonds of the 1937 maturity ONLY of this issue.)

Bonds of the various maturities of this issue will, in the event of future issues of like maturity, or longer, made by the Government, other than issues made abroad, be accepted at par and accrued interest, as the equivalent of cash for the purpose of subscription to such issues.

### Issue Price Par

**Free from taxes including any income tax—Imposed in pursuance of legislation enacted by the Parliament of Canada.**

Payment to be made as follows:

10% on December 1st, 1917	20% on March 1st, 1918
10% on January 2nd, 1918	20% on April 1st, 1918
20% on February 1st, 1918	20% on May 1st, 1918

A full half year's interest will be paid on 1st June, 1918

**The Bonds therefore give a net interest yield to the investor of about:**

**5.61% on the 20 year Bonds**  
**5.68% on the 10 year Bonds**  
**5.81% on the 5 year Bonds**

All payments are to be made to a Chartered Bank for the credit of the Minister of Finance. Failure to pay any instalment when due will render previous payments liable to forfeiture, and the allotment to cancellation. Subscriptions accompanied by a deposit of 10% of the amount subscribed, must be forwarded through the medium of a Chartered Bank. Any branch in Canada of any Chartered Bank will forward subscriptions and issue provisional receipts.

In case of partial allotments the surplus deposit will be applied toward payment of the amount due on the January instalment.

Subscriptions may be paid in full on January 2nd, 1918, or on any instalment due date thereafter under discount at the rate of 5½% per annum. Under this provision payments of the balance of subscriptions may be made as follows:

If paid on January 2nd, 1918, at the rate of \$9.10795 per \$100
If paid on February 1st, 1918, at the rate of 79.16259 per \$100
If paid on March 1st, 1918, at the rate of 59.72271 per \$100
If paid on April 1st, 1918, at the rate of 39.90359 per \$100

Forms of application may be obtained from any branch in Canada of any Chartered Bank or from any Victory Loan Committee, or member thereof.

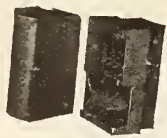
The books of the Loan will be kept at the Department of Finance, Ottawa.

Application will be made in due course for the listing of this issue on the Montreal and Toronto Stock Exchanges.

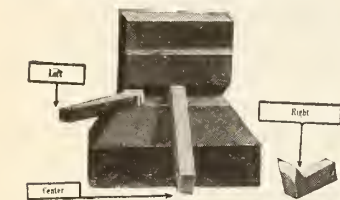
**Subscription Lists will close on or before December 1st, 1917.**

Department of Finance,  
Ottawa, November 12th, 1917





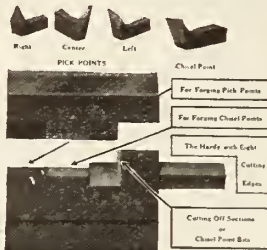
Little Giant puncher pick dies



Little Giant pick point dies

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in forging and sharpening all kinds of coal or metal mining tools with the



Little Giant Combination pick point and chisel bit dies



## Power Hammer

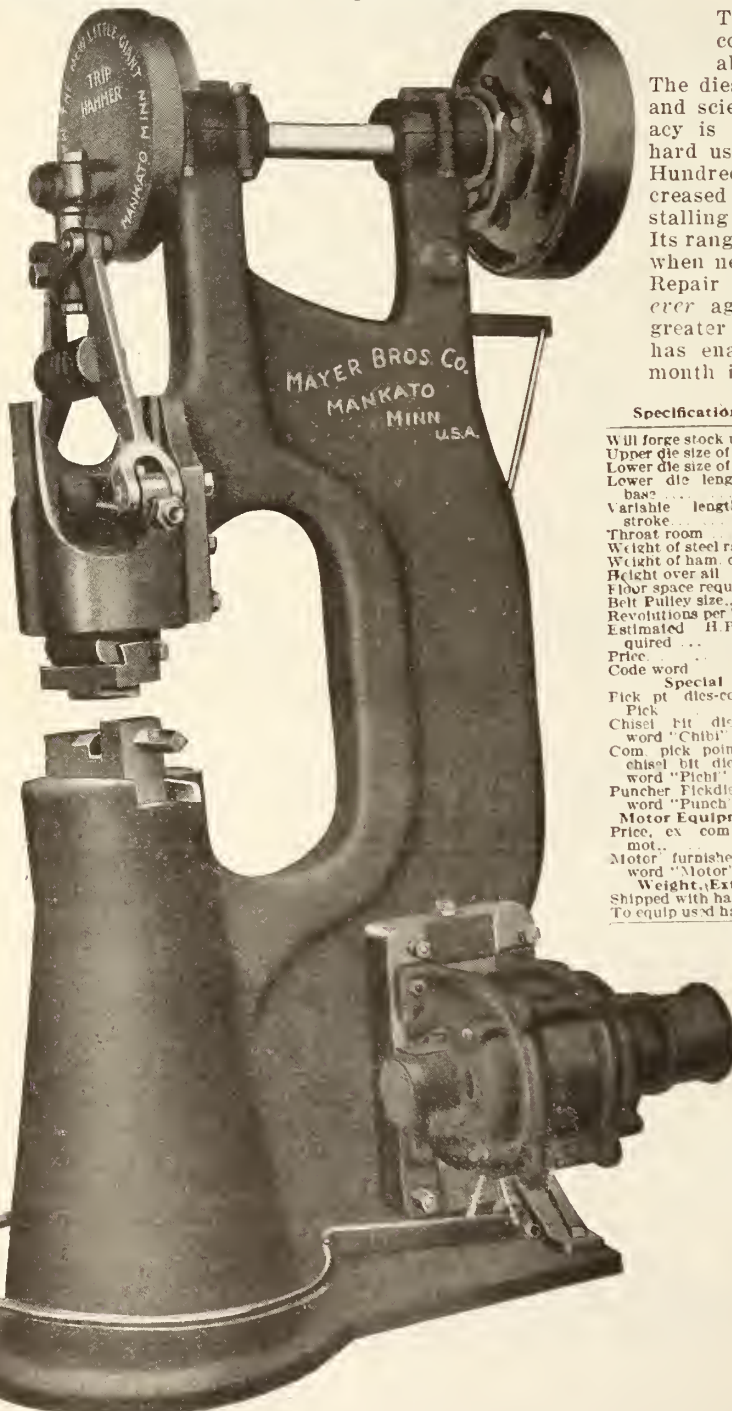
### Motor or Belt Driven

The work will be perfectly true and uniform. The correct cutting angles and the right sharpness is absolutely assured with every tool turned out.

The dies are made by skilled toolmakers of the finest steel and scientifically hardened to minimize wear. Their accuracy is retained for the longest period under continuous hard use.

Hundreds of the best known mines in the country have increased their output and reduced their labor cost by installing this remarkably efficient power hammer.

Its range of work is enormous. Special dies can be furnished when necessary. Built in 25, 50, 100, 250 and 500-lb. sizes. Repair costs are extremely small for it is *guaranteed Forever* against defective material and workmanship. The greater quantity and better quality of the tools produced has enabled the Little Giant to pay for itself within a month in several instances.



Specifications	25 Lb.	50 Lb.	100 Lb.	250 Lb.	500 Lb.
Will forge stock up to	1 1/2 sq. or 2 rd	2 sq. or 2 1/2 rd	3 sq. or 4 rd	5 1/2 sq. or 7 rd	7 sq. or 9 rd.
Upper die size of face	1 1/2 x 3 in.	1 1/2 x 3 1/2 in.	3 x 6 in.	3 1/2 x 8 in.	4 1/2 x 10 in.
Lower die size of face	2 x 3 in.	2 1/2 x 3 1/2 in.	3 x 6 in.	3 1/2 x 8 in.	4 1/2 x 10 in.
Lower die length of base	5 in.	5 1/2 in.	6 in.	8 in.	10 in.
Variable length of stroke	6 to 7 in.	8 to 11 in.	9 to 12 in.	12 to 15 in.	14 to 19 in.
Throat room	6 in.	6 in.	7 1/2 in.	13 in.	15 in.
Weight of steel ram	25 lb.	50 lb.	100 lb.	250 lb.	500 lb.
Weight of ham. comp.	800 lb.	1600 lb.	3300 lb.	5000 lb.	7000 lb.
Height over all	5 ft 4 in.	5 ft 11 in.	6 ft 6 in.	7 ft 8 in.	9 ft.
Floor space required	16 x 27 in.	20 x 30 in.	28 x 42 in.	30 x 54 in.	32 x 62 in.
Belt Pulley size	3 1/2 x 10 in.	4 x 12 in.	5 x 14 in.	8 x 18 in.	9 x 24 in.
Revolutions per min	400	350	300	200	150
Estimated H.P. required	1	1 1/2	2 1/2	4	7 1/2
Price	\$120	\$180	\$360	\$800	\$1350
Code word	Babe	Boy	Man	Giant	Jumbo
<b>Special</b>					
Pick pt. dies-cd. wd					
Pick	\$25	\$25	\$35	\$50	\$65
Chisel bit dies-code word "Chibi"	not used	\$65	\$75	\$90	\$110
Com. pick point and chisel bit dies-code word "Pichi"	not used	\$75	\$85	\$100	\$125
Puncher Pickdies-code word "Punch"	not used	\$65	\$75	\$90	\$110
<b>Motor Equipment</b>					
Price, ex. com. with mot.	\$140	\$175	\$225	\$275	\$400
Motor, furnished-code word "Motor"	1 Hp.	2 Hp.	3 Hp.	5 Hp.	7 1/2 Hp.
<b>Weight, Extra</b>					
Shipped with hammer	180 lb.	260 lb.	310 lb.	450 lb.	700 lb.
To equip used hammer	230 lb.	320 lb.	520 lb.	700 lb.	1430 lb.

Motor quotations include any voltage 2 for 3 phase, 60 cycle, 1200 R. P. M. A.C. Motors Quotations by request on other A.C. or D.C. Motors

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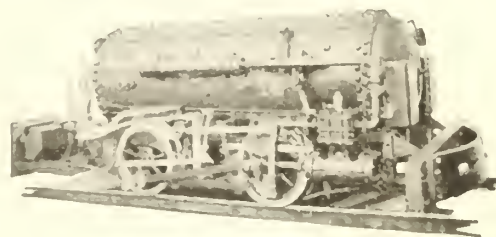
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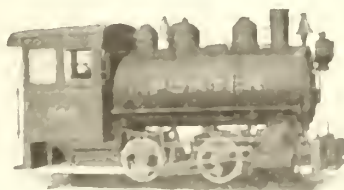
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HON. ARTHUR MEIGHEN, Minister.

R. G. McCONNELL, Deputy Minister.

### MINES BRANCH

#### Recent Publications

The Nickel Industry: with special reference to the Sudbury region, Ont. Report on, by Professor A. P. Coleman, Ph.D.

The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson. Ph.D.

Building and Ornamental Stones of Canada (Western Provinces). Vol IV., by W. A. Parks, Ph.D.

Feldspar in Canada. Report on, by H. S. de Schmid, M.E.

Peat, Lignite and Coal: their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.

Annual Report of Mineral Production during Calendar Year, 1915, by John McLeish, B.A.

The Petroleum and Natural Gas Resources of Canada: Vols. I. and II., by F. G. Clapp, M.A., and others.

The Value of Peat Fuel for the Generation of Steam. Bulletin No. 17, by John Blizard, B.Sc.

Cobalt Alloys with Non-corrosive Properties. Report on, by H. T. Kalmus, B.Sc., Ph.D.

Electro-thermic Smelting of Iron Ores in Sweden. Report on, by A. Stansfield, D.Sc.

Non-metallic Minerals Used in Canadian Manufacturing Industries. Report on, by H. Frechette, M.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

**Fuel Testing Laboratory.**—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.

**Ore-Dressing Laboratory.**—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.

**Chemical Laboratory.**—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.

**Ceramic Laboratory.**—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.

**Structural Materials Laboratory.**—Experimental work on sands, cements and limes is also undertaken.

Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to **The Director, Mines Branch, Department of Mines, Ottawa.**

### GEOLOGICAL SURVEY

#### Recent Publications

Memoir 85. Road Material Surveys in 1914, by L. Reinecke.

Memoir 87. Geology of a Portion of the Flathead Coal Area, British Columbia, by J. D. Mackenzie.

Memoir 92. Part of the District of Lake St. John, Quebec, by John A. Dresser.

Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.

Memoir 94. Ymir Mining Camp. British Columbia, by Charles Wales Drysdale.

Memoir 95. Onaping Map-Area, by W. H. Collins.

Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.

Memoir 97. Scroggie, Barker, Thistle and Kirkman Creeks, Yukon Territory, by D. D. Cairnes.

Memoir 98. Magnesite Deposits of Grenville District, Argen-teuil County, Quebec, by M. E. Wilson.

Map 57A. Frank, Alberta (showing the landslide of 1903).

Map 63A. Moncton Sheet, Westmorland and Albert Counties, New Brunswick. Topography.

Map 151A. Nansen and Victoria Creeks, Nisling River, Yukon Territory.

Map 152A. Kluane Lake, Yukon Territory.

Map 154A. Southwestern Yukon.

Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.

Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.

Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.

Map 166A. Portion of Flathead Coal Area, Kootenay District, B.C. Topography.

Map 182A. Portion of Flathead Coal Area. Geology.

Map 186A. Explored Routes between Lake Athabaska and Great Slave Lake on the Tazin, Taltson, Slave and Peace Rivers.

Map 1667. Slocan Mining Area, Kootenay District, B.C.

Map 1677. Coleraine Sheet, Megantic and Wolfe Counties, Quebec.

Applicants for publications not listed above should mention the precise area concerning which information is desired.

Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to **The Director, Geological Survey, Ottawa.**

## To Users of the Callow Pneumatic Flotation Cell

**U**SERS of the Callow Cell are naturally interested in knowing how the decision of the United States Circuit Court of Appeals for the Third District, in the Miami case, will affect their interests.

As we understand the prevailing opinion of Judge Woolley in the Miami case he has interpreted the Supreme Court decision in the Hyde case as meaning that "*invention resides not alone in the critical proportion of oil, but also in air and agitation,*" and again, "*in the co-action of the critical proportion of oil and air effected by 'an agitation greater than, and different from that which had been resorted to before,' resulting in a froth concentrate of economical value,*" and further, that the Supreme Court did not limit the patent to "*agitation by mechanical means,*" but to agitation of a violent and persistent kind; "*it mixes the oil with the metal of the ore. This is old. Then, by its greater intensity and longer duration, it stirs the pulp into a froth.*"

Thus, this decision of the Third Circuit Court of Appeals has a most important bearing upon the art, because it holds that the mixing of the oil with the mineral is old, but it **leaves open the use of oil in connection with aeration-cells.**

Meanwhile the idea of a "*critical*" proportion of oil has been dis-

proved by practice in several mills within a short time after it was promulgated.

Judge Woolley says further, concerning the Callow Cell: "*Aeration is direct, and is not the result of or caused by agitation. On the contrary, agitation results from aeration and such agitation, though present in some measure, is not even approximately of the violence and duration of the agitation of the patent. The operation in the Callow Cell certainly possesses these distinguishing features from operation of the process where aeration is caused by agitation.*"

The Court further confirms this important dictum by saying: "*If the only agitation to which the pulp was subjected (after such agitation as in the prior art was necessary to mix the oil and ore) was the agitation of the Callow Cells, we would not say that that agitation amounted to or was the equivalent of the violent agitation of the patent disclosure and constituted infringement.*"

Apparently users of the Callow Cell may feel assured they do not infringe the method of agitation described in U.S. Patent No. 835,120 (less than 1% oil), No. 962,678 (soluble frothing agents), No. 1,099,699 (phenol or cresol in the cold without acid) since all three of the patents are of the same process, dependent upon a certain degree of violence and length of agitation and the production of the same characteristic froth, as set forth in their claims

(Signed) J. M. Callow.





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**Smelters and Refiners of Cobalt Ores**

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MANITOBA:	-	-	-	-	-	Winnipeg
ALBERTA:	-	-	-	-	-	Edmonton
BRITISH COLUMBIA:	Vancouver,	Victoria,	Nelson,	-	-	Prince Rupert

### Factories at

Beloeil, P.Q.	Vaudreuil, P.Q.	Windsor Mills, P.Q.
Waverley, N.S.	James Island, B.C.	Nanaimo, B.C.
Northfield, B.C.	Bowen Island, B.C.	Parry Sound, Ont.

# The Canadian Miners' Buying Directory.

**Air Holsts—**  
Canadian Ingersoll-Rand Co.  
Ltd.

**Amalgamators—**  
Northern Canada Supply Co.

**Antimony—**  
Canada Metal Co., Ltd.

**Assayers and Chemists—**  
Milton L. Hersey Co., Ltd.  
Campbell & Deyell, Cobalt.  
Ledoux & Co., 99 John St.,  
New York.  
Thos. Heys & Son.  
C. L. Constant Co.  
Koering Cyaniding Process  
Company.

**Assayers' and Chemists Sup-  
plies—**  
C. L. Berger & Sons, 37 Wil-  
liam St., Boston, Mass.  
Lymans, Ltd., Montreal, Que.  
Stanley, W. F. & Co., Ltd.  
Koering Cyaniding Process  
Company.

**Babbitt Metals—**  
Canada Metal Co., Ltd.  
Can. B. K. Morton.  
Can. Fairbanks-Morse Co.  
Hoyt Metal Co.

**Ball Mills—**  
Hull Iron & Steel Foundries,  
Ltd.

**Belting—Leather, Rubber and  
Cotton—**  
Can. Fairbanks-Morse Co.  
Northern Canada Supply Co.  
Jones & Glassco.  
Can. B. K. Morton.

**Blasting Batteries and Sup-  
plies—**  
Can. Ingersoll-Rand Co.,  
Ltd.  
Curtis & Harvey (Canada)  
Ltd.  
Northern Canada Supply Co.  
Canadian Explosives, Ltd.

**Blowers—**  
Can. Fairbanks-Morse Co.  
Northern Canada Supply Co.

**Bollers—**  
Can. Fairbanks-Morse Co.  
Northern Canada Supply Co.  
Can. Ingersoll-Rand Co.,  
Ltd.  
Can. Allis-Chalmers, Ltd.

**Boxes, Cable Junction—**  
Standard Underground Cable  
Co. of Canada, Ltd.

**Buckets—**  
Can. Fairbanks-Morse Co.  
Hendrick Mfg. Co.  
M. Beatty & Sons, Ltd.  
Northern Canada Supply Co.

**Cable—Aerial and Under-  
ground—**  
Northern Canada Supply Co.  
Standard Underground Cable  
Co. of Canada, Ltd.

**Cableways—**  
M. Beatty & Sons, Ltd.  
Can. Allis-Chalmers, Ltd.

**Cages—**  
Northern Canada Supply Co.

**Cables—Wire—**  
Standard Underground Cable  
Co. of Canada, Ltd.

**Car Dumps—**  
Sullivan Machinery Co.

**Cars—**  
Can. Fairbanks-Morse Co.  
Northern Canada Supply Co.  
MacKinnon, Holmes & Co.

**Cement Machinery—**  
Northern Canada Supply Co.  
Hull Iron & Steel Foundries,  
Ltd.  
Can. Allis-Chalmers, Ltd.

**Chains—**  
Can. Fairbanks-Morse Co.  
Jones & Glassco.  
Northern Canada Supply Co.  
B. Greening Wire Co., Ltd.

**Chemists—**  
Canadian Laboratories.  
Campbell & Deyell.  
Thos. Heys & Sons.  
Milton Hersey Co.  
Ledoux & Co.

**Coal—**  
Dominion Coal Co.  
Nova Scotia Steel & Coal Co.

**Coal Cutters—**  
Sullivan Machinery Co.  
Can. Ingersoll-Rand Co., Ltd.

**Coal Mining Explosives—**  
Curtis & Harvey (Can.),  
Ltd.  
Canadian Explosives, Ltd.

**Coal Mining Machinery—**  
Can. Ingersoll-Rand Co., Ltd.  
Sullivan Machinery Co.

**Coal Pick Machines—**  
Sullivan Machinery Co.  
Can. Ingersoll-Rand Co., Ltd.

**Compressors—Air—**  
Can. Fairbanks-Morse Co.  
Escher Wyss & Co.  
Smart-Turner Machine Co.  
Can. Ingersoll-Rand Co., Ltd.  
Northern Canada Supply Co.  
Can. Allis-Chalmers, Ltd.

**Concrete Mixers—**  
Can. Fairbanks-Morse Co.  
Northern Canada Supply Co.  
Wettlaufer Bros.  
Can. Allis-Chalmers, Ltd.

**Condensers—**  
Smart-Turner Machine Co.  
Northern Canada Supply Co.  
Can. Allis-Chalmers, Ltd.

**Converters—**  
Northern Canada Supply Co.

**Conveyer—Trough—Belt—**  
Can. Fairbanks-Morse Co.  
Hendrick Mfg. Co.

**Cranes—**  
Can. Fairbanks-Morse Co.  
Smart-Turner Machine Co.  
M. Beatty & Sons, Ltd.

**Crane Hooks—**  
Allan, Whyte & Co.  
Can. B. K. Morton.

**Grinding Plates—**  
Hull Iron & Steel Foundries,  
Ltd.

**Crushers—**  
Can. Fairbanks-Morse Co.  
Lymans, Ltd.  
Mussens, Limited.  
Hull Iron & Steel Foundries,  
Ltd.  
Wettlaufer Bros.  
Can. Allis-Chalmers, Ltd.

**Cyaniding Process—**  
Koering Cyaniding Process  
Co.  
Can. Allis-Chalmers, Ltd.

**Derricks—**  
Can. Fairbanks-Morse Co.  
Smart-Turner Machine Co.  
M. Beatty & Sons, Ltd.  
Can. Allis-Chalmers, Ltd.

**Diamond Drill Contractors—**  
Diamond Drill Contracting  
Co.  
Smith & Travers.  
Sullivan Machinery Co.

**Dredger Pumps—**  
Armstrong, Whitworth of  
Canada, Ltd.

**Dredging Machinery—**  
M. Beatty & Sons.

**Dredging Hoses—**  
Allan, Whyte & Co.  
Can. B. K. Morton.

**Drills, Air and Hammer—**  
Can. Ingersoll-Rand Co., Ltd.  
Sullivan Machinery Co.  
Northern Canada Supply Co.  
Can. Allis-Chalmers, Ltd.

**Drills—Core—**  
Can. Ingersoll-Rand Co., Ltd.  
Standard Diamond Drill Co.  
Sullivan Machinery Co.  
Can. Allis-Chalmers, Ltd.

**Drills—Diamond—**  
Sullivan Machinery Co.  
Northern Canada Supply Co.

**Drill Steel—Mining—**  
Armstrong, Whitworth of  
Can., Ltd.  
Can. B. K. Morton.

**Drill Steel Sharpeners—**  
Can. Ingersoll-Rand Co., Ltd.  
Northern Canada Supply Co.  
Sullivan Machinery Co.

**Drills—Electric—**  
Can. Ingersoll-Rand Co., Ltd.  
Sullivan Machinery Co.

**Drills—High Speed and Car-  
bon—**  
Armstrong Whitworth of  
Can., Ltd.  
Can. Fairbanks-Morse Co.  
Can. B. K. Morton.

**Dynamite—**  
Curtis & Harvey (Canada),  
Ltd.  
Canadian Explosives.  
Northern Canada Supply Co.

**Ejectors—**  
Can. Fairbanks-Morse Co.  
Can. Ingersoll-Rand Co., Ltd.  
Northern Canada Supply Co.

**Elevators—**  
M. Beatty & Sons.  
Sullivan Machinery Co.  
Northern Canada Supply Co.  
Wettlaufer Bros.

**Electrical Supplies—**  
Can. Gen. Electric Co., Ltd.

**Electric Mine Locomotives—**  
Can. Gen. Electric Co., Ltd.

**Engineering Instruments—**  
C. L. Berger & Sons.

**Engineers & Contractors—**  
Foundation Co., Ltd., of  
Montreal.

**Engines—Automatic—**  
Can. Fairbanks-Morse Co.  
Smart-Turner Machine Co.

**Engines—Gas and Gasoline—**  
Can. Fairbanks-Morse Co.  
Alex. Fleck.  
Sullivan Machinery Co.  
Smart-Turner Machine Co.  
Can. Allis-Chalmers, Ltd.

**Engines—Haulage—**  
Can. Fairbanks-Morse Co.  
Can. Ingersoll-Rand Co., Ltd.  
Can. Allis-Chalmers, Ltd.

**Engines—Marine—**  
Can. Fairbanks-Morse Co.  
Smart-Turner Machine Co.

**Engines—Steam—**  
Smart-Turner Machine Co.  
M. Beatty & Sons.  
Can. Allis-Chalmers, Ltd.

**Fans—Ventilating—**  
Can. Fairbanks-Morse Co.  
Can. Allis-Chalmers, Ltd.

**Flotation Oils—**  
Georgia Pine Turpentine Co.  
of New York

**Forges—**  
Can. Fairbanks-Morse Co.  
Northern Canada Supply Co.  
Ltd.

**Forging—**  
M. Beatty & Sons.  
Smart-Turner Machine Co.

**Furnaces—Assay—**  
Lymans, Ltd.

**Fuse—**  
Curtis & Harvey (Canada),  
Ltd.  
Canadian Explosives.  
Northern Canada Supply Co.  
Generators—  
Can. Gen. Electric Co., Ltd.

**Gears—**  
Can. Fairbanks-Morse Co.  
Smart-Turner Machine Co.  
Northern Canada Supply Co.  
Hull Iron & Steel Foundries,  
Ltd.

**Hammer Rock Drills—**  
Mussens, Limited.  
Can. Allis-Chalmers, Ltd.

**Hangers—Cable—**  
Standard Underground Cable  
Co. of Canada, Ltd.

**High Speed Steel—**  
Armstrong, Whitworth of  
Canada, Limited.

**High Speed Steel Twist Drills—**  
Northern Canada Supply Co.  
Armstrong, Whitworth of  
Canada, Ltd.

**Holsts—Air, Electric and  
Steam—**  
Can. Fairbanks-Morse Co.  
Can. Ingersoll-Rand Co., Ltd.  
Jones & Glassco.  
M. Beatty & Sons.  
Northern Canada Supply Co.  
Wettlaufer Bros.  
Can. Allis-Chalmers, Ltd.

**Hoisting Engines—**  
Can. Fairbanks-Morse Co.  
Mussens, Limited.  
Sullivan Machinery Co.  
Can. Ingersoll-Rand Co., Ltd.  
M. Beatty & Sons.  
Can. Allis-Chalmers, Ltd.

**Hose—**  
Can. Fairbanks-Morse Co.  
Northern Canada Supply Co.

**Ingot Copper—**  
Canada Metal Co., Ltd.  
Hoyt Metal Co.

**Insulating Compounds—**  
Standard Underground Cable  
Co. of Canada, Ltd.

**Jacks—**  
Can. Fairbanks-Morse Co.  
Can. Ingersoll-Rand Co., Ltd.  
Northern Canada Supply Co.

**Kiln Linings—**  
Hull Iron & Steel Foundries,  
Ltd.

**Kommuters—**  
Hull Iron & Steel Foundries,  
Ltd.

**Lamps—**  
Can. Gen. Electric Co., Ltd.

**Lamps—Carbon—**  
J. S. Aspinall.

**Lamps—Electric—**  
J. S. Aspinall.  
**Lamps—Safety—**  
Canadian Explosives.

**Lamps—Tungsten—**  
J. S. Aspinall.

**Link Belt—**  
Can. Fairbanks-Morse Co.  
Northern Canada Supply Co.  
Jones & Glassco.

**Motors—**  
Can. Gen. Electric Co., Ltd.

**Machinists and Founders—**  
Hull Iron and Steel Found-  
ries, Ltd.

**Metal Merchants—**  
Henry Bath & Son.  
Geo. G. Blackwell, Sons &  
Co.  
Consolidated Mining &  
Smelting Co. of Canada  
Canada Metal Co.  
C. L. Constant Co.

**Monel Metal—**  
International Nickel Co.

**Nickel—**  
International Nickel Co.

**Ore Sacks—**  
Northern Canada Supply Co.

**Ore Testing Works—**  
Ledoux & Co.  
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Milton Hersey Co., Ltd.  
Campbell & Deyell.  
Hoyt Metal Co.

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Sellers of—**  
C. L. Constant Co.  
Geo. G. Blackwell.  
Consolidated Mining and  
Smelting Co. of Canada  
Orford Copper Co.  
Canada Metal Co.  
Hoyt Metal Co.

**Perforated Metals—**  
Northern Canada Supply Co.  
Hendrick Mfg. Co.

**Pig Tin—**  
Canada Metal Co., Ltd.  
Hoyt Metal Co.

**Pig Lead—**  
Canada Metal Co., Ltd.  
Hoyt Metal Co.



## Canadian Miners' Buying Directory.—(Continued from page 21.)

<b>Pipes—</b> Can. Fairbanks-Morse Co. Canada Metal Co., Ltd. Consolidated M. & S. Co. Pacific Coast Pipe Co., Ltd. Northern Canada Supply Co. Smart-Turner Machine Co.	<b>Pumps—Electric—</b> Can. Fairbanks-Morse Co. Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd. Jenckes Machine Co. Can. Allis-Chalmers, Ltd.	<b>Rope—Wire—</b> Allan, Whyte & Co. Northern Canada Supply Co. Can. B. K. Morton	<b>Steel Drums—</b> Smart-Turner Machine Co.
<b>Pipe Fittings—</b> Can. Fairbanks-Morse Co. Northern Canada Supply Co.	<b>Pumps—Pneumatic—</b> Can. Fairbanks-Morse Co. Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd. Sullivan Machinery Co.	<b>Steel—High Speed—</b> Can. B. K. Morton	<b>Steel—Tool—</b> N. S. Steel & Coal Co. Armstrong, Whitworth of Can., Ltd.
<b>Piston Rock Drills—</b> Mussens, Limited. Can. Allis-Chalmers, Ltd.	<b>Pumps—Steam—</b> Can. Fairbanks-Morse Co. Can. Ingersoll-Rand Co., Ltd. Mussens, Limited. Northern Canada Supply Co. Jenckes Machine Co. Can. Allis-Chalmers, Ltd.	<b>Samplers—</b> C. L. Constant Co. Ledoux & Co. Milton Hersey Co. Thos. Heys & Son.	<b>Surveying Instruments—</b> W. F. Stanley. C. L. Berger.
<b>Pneumatic Tools—</b> Can. Ingersoll-Rand Co., Ltd. Jones & Glassco. Jenckes Machine Co.	<b>Pumps—Turbine—</b> Can. Fairbanks-Morse Co. Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd. ada, Limited. Can. Allis-Chalmers, Ltd.	<b>Scales—</b> Can. Fairbanks-Morse Co.	<b>Switchboards—</b> Can. Gen. Electric Co., Ltd.
<b>Prospecting Mills and Machinery—</b> Standard Diamond Drill Co. Can. Allis-Chalmers, Ltd.	<b>Pumps—Vacuum—</b> Can. Fairbanks-Morse Co. Smart-Turner Machine Co. Can. Allis-Chalmers, Ltd.	<b>Screens—</b> Jeffrey Mfg. Co. Northern Canada Supply Co. Hendrick Mfg. Co.	<b>Tanks—Cyanide, Etc.—</b> Hendrick Mfg. Co. Pacific Coast Pipe Co., Ltd. MacKinnon, Holmes & Co. Can. Allis-Chalmers, Ltd.
<b>Pulleys, Shafting and Hangings—</b> Can. Fairbanks-Morse Co. Jeffrey Mfg. Co. Northern Canada Supply Co.	<b>Quarrying Machinery—</b> Sullivan Machinery Co. Can. Ingersoll-Rand Co., Ltd. Jenckes Machine Co. Can. Allis-Chalmers, Ltd.	<b>Screens—Cross Patent Flanged Lip—</b> Hendrick Mfg. Co.	<b>Transits—</b> C. L. Berger & Sons.
<b>Pumps—Boiler Feed—</b> Can. Fairbanks-Morse Co. Smart-Turner Machine Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd. Wettlaufer Bros. Can. Allis-Chalmers, Ltd.	<b>Roofing—</b> Can. Fairbanks-Morse Co. Northern Canada Supply Co.	<b>Separators—</b> Can. Fairbanks-Morse Co. Smart-Turner Machine Co.	<b>Transformers—</b> Can. Gen. Electric Co., Ltd.
<b>Pumps—Centrifugal—</b> Can. Fairbanks-Morse Co. Escher Wyss & Co. Mussens, Limited. Smart-Turner Machine Co. M. Beatty & Sons. Can. Ingersoll-Rand Co., Ltd. Can. Allis-Chalmers, Ltd.	<b>Rope—Manilla and Jute—</b> Jones & Glassco. Northern Canada Supply Co. Allan, Whyte & Co.	<b>Sheet Lead—</b> Canada Metal Co., Ltd.	<b>Turbines—</b> Escher Wyss & Co. Can. Allis-Chalmers, Ltd.
		<b>Sheets—Genuine Manganese Bronze—</b> Hendrick Mfg. Co.	<b>Twist Drills—High Speed—</b> Can. B. K. Morton Co.
		<b>Shovels—Steam—</b> M. Beatty & Sons. Can. Allis-Chalmers, Ltd.	<b>Valves—</b> Can. Fairbanks-Morse Co.
		<b>Stacks—Smoke Stacks—</b> Can. Fairbanks-Morse Co. Hendrick Mfg. Co. MacKinnon, Holmes & Co. Can. Allis-Chalmers, Ltd.	<b>Winding Engines—Steam &amp; Electric—</b> Can. Ingersoll-Rand Co., Ltd. Jenckes Machine Co. Can. Allis-Chalmers, Ltd.
		<b>Steel Barrels—</b> Smart-Turner Machine Co.	<b>Wire Cloth—</b> Northern Canada Supply Co. B. Greening Wire Co., Ltd.
		<b>Steel Drills—</b> Sullivan Machinery Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd. Can. B. K. Morton.	<b>Wire (Bare and Insulated)—</b> Standard Underground Cable Co., of Canada, Ltd.
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# Ontario's Mining Lands

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Ontario, with its 407,262 square miles of area, contains many millions of acres in which the geological formations are favourable for the occurrence of minerals, 70 per cent. of the rocks being of pre-Cambrian age.

The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Helen, Magpie and Moose Mountain mines.

Many other varieties of useful products are found in Ontario:—cobalt, iron pyrites, arsenic, quartz, graphite, talc, feldspar, mica, corundum, molybdenite, platinum, palladium, actinolite, apatite, fluorite, salt, gypsum, petroleum and natural gas.

Building materials, such as cement, brick, marble, limestone, sandstone, trap, lime, sand and gravel, are abundant.

Ontario in 1915 produced over 44 per cent. of the total mineral production of Canada, or more than twice that from any other Province. The preliminary report of the Ontario Bureau of Mines shows the output of the mines and metallurgical works of Ontario for the year 1915 to be worth \$57,532,844, of which the metallic production was \$47,721,180. There were 79 producing mines, 62 of which operated at a profit.

The prospector can go almost anywhere in the mineral regions in his canoe; the climate is invigorating and healthy, and there is plenty of wood and good water.

A miner's license costs \$5.00 per annum and entitles the holder to stake out in any or every mining division three claims of 40 acres each.

For list of publications, illustrated reports, geological maps and mining laws, apply to

**HON. G. H. FERGUSON,**

Minister of Lands, Forests and Mines

**Toronto, Canada**



Hear what one of the largest users has to say about our products.

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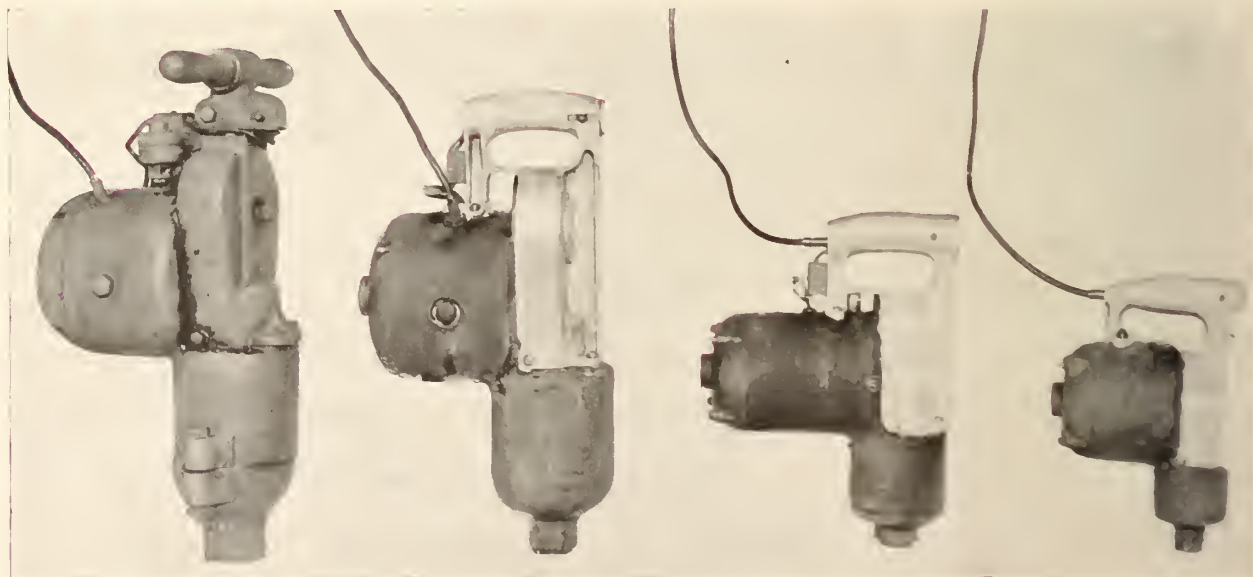
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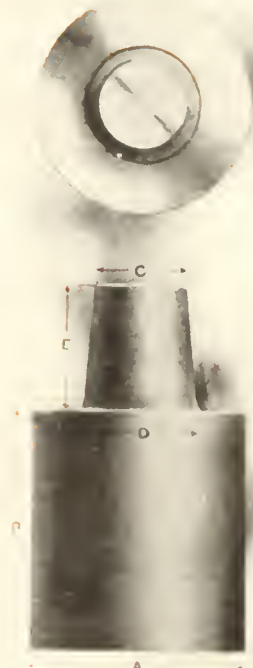
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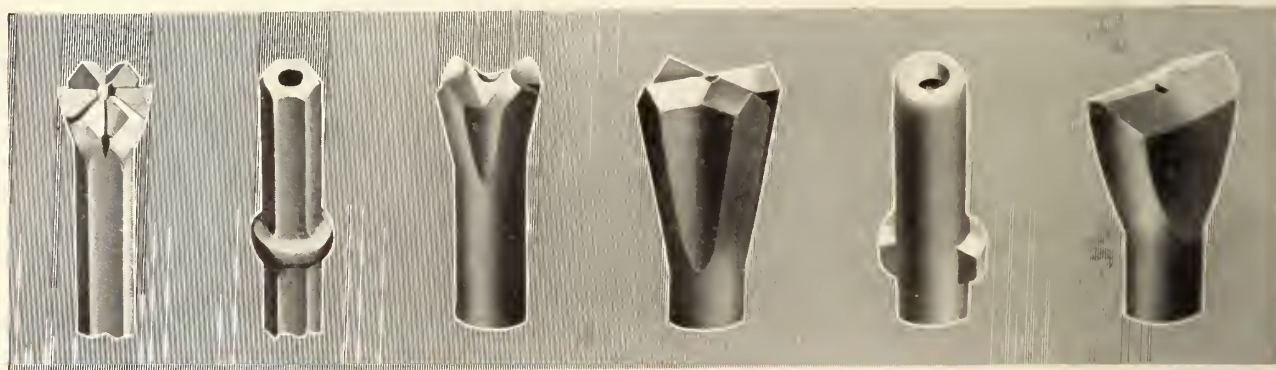
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HULL, P. Q. **LIMITED** CANADA



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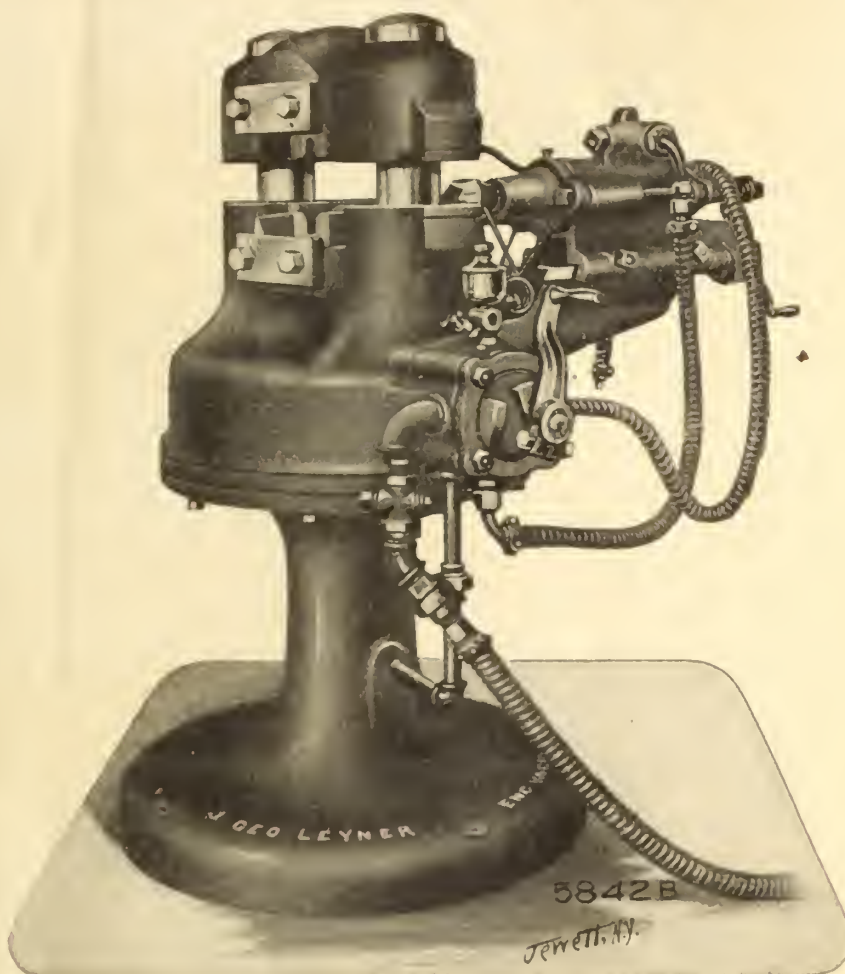
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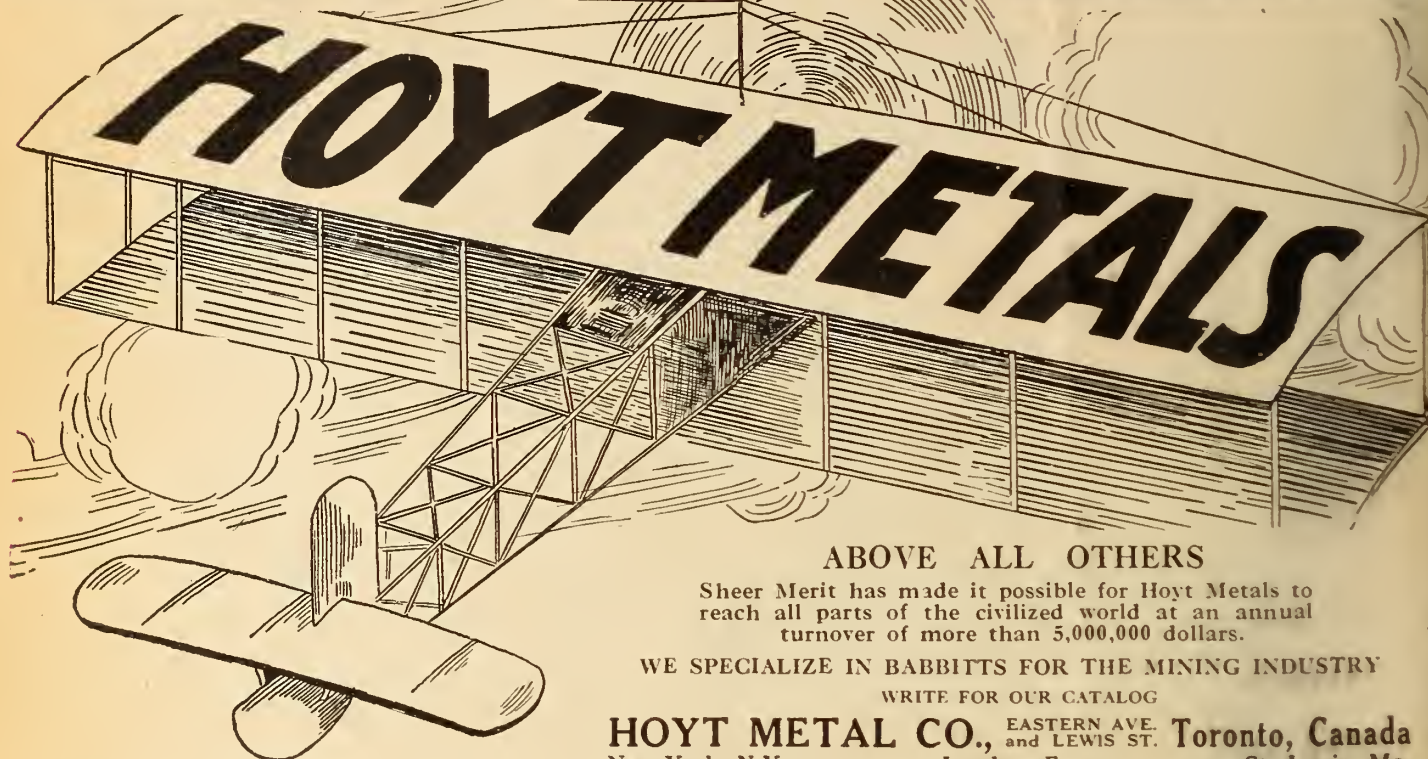
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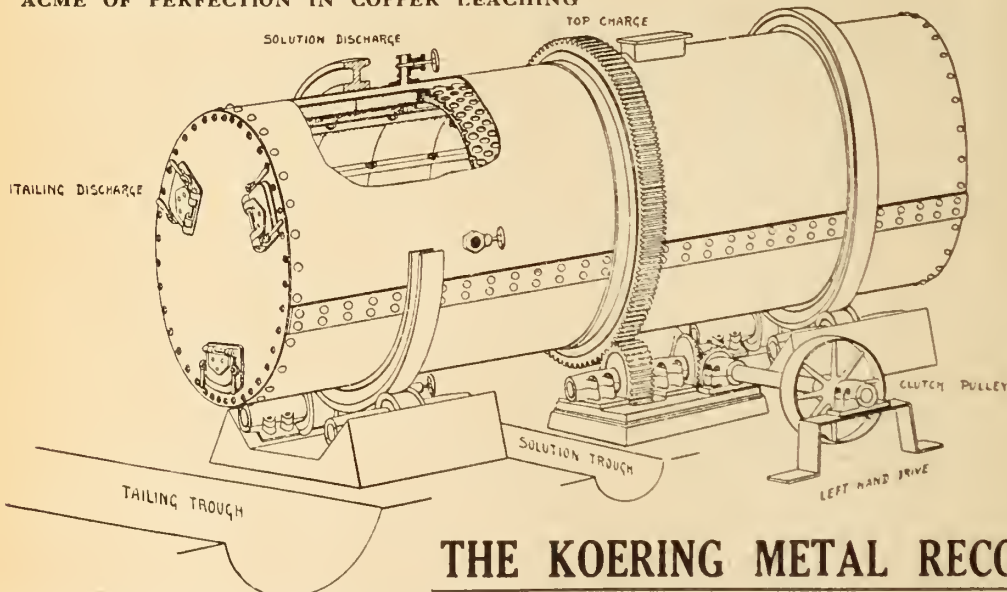
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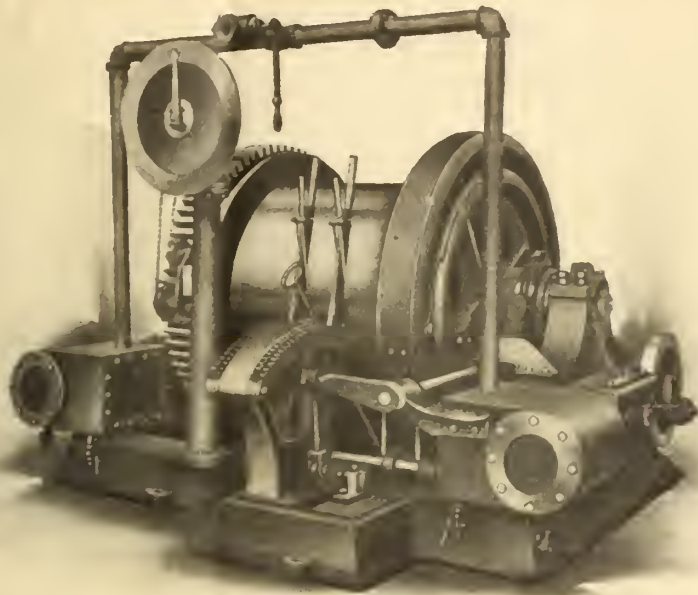
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**Gold** Marked development has taken place in this industry the past several years. The gold fields of the province cover an area approximately 3,500 square miles. The gold is free milling and is from 870 to 970 fine.

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**MINERS' CERTIFICATES.** First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

**WORKING CONDITIONS.** During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

**SIX MONTHS AFTER STAKING.** At the expiration of six months from date of the staking, the prospector, to retain his rights, must take out a mining license.

**MINING LICENSE.** The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

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The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

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On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

### NOTICE

Notice is hereby given that we will enforce our patents and stop all infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

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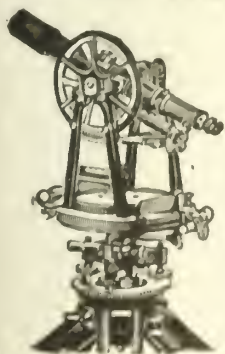
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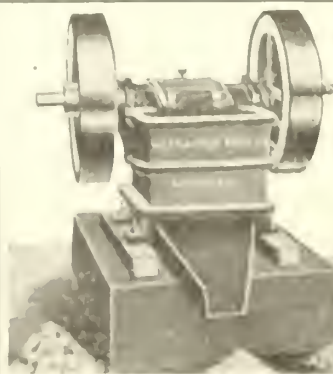


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# THE CANADIAN MINING JOURNAL

VOL. XXXVIII.

TORONTO, December 1st, 1917.

No. 23

## The Canadian Mining Journal

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Devoted to Mining, Metallurgy and Allied Industries in Canada.

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**MINES PUBLISHING CO., LIMITED**

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Editor: REGINALD E. HORE, B.A. (Toronto).

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The appointment of an incompetent editorial board to edit the reports of technical departments and the acceptance by the House of an absurd report from the Committee on Public Printing are evidence that we cannot depend on the politicians of any party to give intelligent consideration to matters affecting the basic industries of the country. It is time that technical men and others engaged in the basic industries expressed their opinion of such acts. If we must have an editorial board, should not the technical departments have competent representatives on it? The best trained men in the service of this country are in the technical departments. What is the use of endeavoring to keep such men in the service if they are to report only what a board of non-technical men believe to be valuable?

### RETROGRADE LEGISLATION.

As a result of a report on public printing, made by a joint committee of both Houses, a decidedly unsatisfactory condition of affairs has been brought about. In view of the waste that has been going on, the making of an inquiry was very necessary. Some good results were obtained: but the committee was evidently not very well informed and unfortunately some foolish recommendations passed through the House without criticism. That members of the House should show such lack of intelligence in dealing with matters affecting the mineral industry is, unfortunately, nothing new; but it is surprising that a committee appointed to make an enquiry should be willing to so misrepresent the facts. The House doubtless accepted the report as an honest statement. If we had in the Cabinet a real Minister of Mines, the absurdity of some of the statements made by members of this committee would doubtless have resulted in the report being challenged. As no one was present to defend the Mines Department, and as the average member of the House knows next to nothing about the mineral industry, the House accepted the report and acted on it as though it were a fair presentation of the facts. As a result there was appointed a board of three censors of publications, which is entirely unqualified to pass on reports affecting the mineral industry and is unqualified to pass on the work of any of the technical departments. This is retrograde legislation and the best interests of the country demand that it should not be allowed to pass without revision.

In the misleading report, presented by Mr. J. A. Currie, from the Joint Committee of both Houses, it is stated that "the Committee is of opinion that no interest would have been injured had there been a total suspension of the publications of this (the Mines) Department as soon as the war commenced." Would it not be well for this Committee to express its ideas on how war should be waged? Apparently Mr. Lloyd George in declaring that this war is largely one of munitions has not had the advice of this Committee. The world at large seems to be under the impression, not shared in by the Committee, that the intelligent utilization of our natural resources is at this time of even more than ordinary importance.

The majority of members of the House take no interest in and know practically nothing of the work of the technical Departments. Even our so-called Ministers of Mines are quite innocent of the work being done. The work might be improved and extended by a capable Minister, and is not beyond criticism; but it is not the fault of the House that it is as good as it is. It ill becomes the House therefore to interfere and cut down the efficiency of the Department.



Apparently the Committee on Public Printing measured the value of government reports by the number of requests received by members for copies. They reported that "many of the publications of this (the Mines) Department are not of public interest." This is an indirect tribute to the service that the Mines Department is giving, for it shows that the people who are really interested in the mineral industry are applying to that Department instead of to members of the House for information.

It is true that novices sometimes apply to members of the House for information concerning the mineral industry and some requests for reports are received by members, but anyone much interested in mining soon learns to apply directly to the Mines Department.

The work being done by the Mines Department is for the good of the public. The investigations are of permanent value and should be recorded in such a manner that the public can benefit from them. It would be folly to prevent publication of this work and it is deliberately false to state that no interest would have been injured by a total suspension of the publications of this Department.

That the report of the Committee on Public Printing is not in accordance with the facts is shown by such statements as the following, made by Mr. Currie in presenting the report: "The Mines Department has spent something like \$5,000 publishing a big book with regard to a mine not in Canada, and with which Canada has nothing to do." It is probable that many of those who heard Mr. Currie, believed that he was telling the truth and that they voted the way they did without realizing that they were being falsely informed. They probably supposed that the man who made such a statement did so after a careful investigation. The Committee was appointed to investigate and report and it is not unnatural to have expected that the facts would be presented. But what are the facts?

The report to which Mr. Currie referred was one on the Wabana iron ores of Newfoundland. His statement as to the cost of publishing the report is not reliable. His statement that Canada has nothing to do with the Wabana mines is absurd. On the contrary the Wabana deposits supply most of the iron ore used in Canada. The deposits are owned by and being worked by two of our largest producers of iron and steel.

After discussion of the report of the Committee on Public Printing it was decided at the last session of the House to create an editorial board of three members of the Civil Service, "thoroughly conversant with public affairs." Three gentlemen who are wholly unqualified to edit technical reports, such as those of the Mines Department, were chosen. If the Government considers it advisable to appoint an editorial board, it might at least attempt to choose a competent one.

### The Editorial Board.

The Committee on Public Printing reported in part: "The most effective way to bring about economies in Canadian Parliamentary and Departmental printing is, in the opinion of the Committee, to create an editorial board of three members of the Civil Service, thoroughly conversant with public affairs, and with a knowledge of Departmental workings. This board should have plenary powers to order such excisions of copy of Departmental reports, leaflets, bulletins, memoirs, etc., or to refuse to sanction the printing of any report, if, in their judgment, the public interest would not be seriously affected by such refusal.

"It would be the duty of the Board to call upon the Deputy Head of any Department or Branch of the Public Service created by Parliament, whose requisition and 'copy' for printing were under consideration, to show cause why any proposed reductions in 'copy' should not be made or the printing thereof suspended entirely, and only upon the direct written authority of the Minister of the Department interested should the decision of the Board of Editors be countermanded."

This recommendation was acted upon and an editorial board appointed. This board is called upon to edit the reports offered for publication. Although wholly unqualified for the task, it pretends to be able to consider intelligently all sorts of technical matters. Although not a member of the board is guilty of possessing any technical knowledge of any consequence, the board will determine what should be published by the technical departments.

The members of the board may be very capable in their own departments; but it is unfair to ask them to edit technical reports. If they knew enough about this work to be able to appreciate their foolish position, they would doubtless refuse to undertake the task. However, they probably feel proud of their new responsibilities and cannot be expected to turn down what looks like promotion, without trying the impossible. It is up to the Government to put these men at work which they can do. This is no time to be introducing retrograde legislation. Technical men were never more useful than now.

Who are these men who are to edit the reports of important technical departments? Are they men of technical training and experience? Not at all. Mr. Fred Cook, Assistant Kings Printer, Mr. F. C. T. O'Hara, Deputy Minister of Trade and Commerce and Mr. Francis C. C. Lynch, Superintendent of Natural Resources, Intelligence Branch of the Department of the Interior, are the three men who have been placed in this foolish position. None of them pretend to have had a training that would warrant their assuming such duties.

There may be reports that these three men could edit: but it would be folly to allow such incompetents to interfere with the technical departments. These gentlemen could give advice on running a newspaper, if our Government proposes to imitate the American Government, but they cannot intelligently edit the reports of the Mines Department.

Northern Ontario mining districts have contributed handsomely to the Victory Loan. The Temiskaming district passed its objective in the second week of the campaign.

It is reported that one in seven of the people of Cochrane subscribed to the Victory Loan. Recalling that the town has suffered disastrously from fires, this is a very remarkable showing.

### PROSPECTING FOR OIL IN ONTARIO.

During the past summer Mr. M. Y. Williams, of the Geological Survey, Ottawa, has been engaged gathering information for the purpose of making a geological map of the area in the vicinity of Rockwood, Ontario. As was pointed out by Mr. Williams in an article published in the July 15 number of this Journal, the geological features at Rockwood are favorable for the occurrence of oil and gas. There is no certainty that important deposits occur there; but the work of Dr. Williams has already led to preparations being made by oil men for thoroughly testing the area.

Ontario is, and has been for decades, a large producer of oil. The Lambton and Bothwell fields have been Canada's premier oil fields for many years. Their output is slowly but steadily declining. Other fields, more recently opened up, do not give evidence of taking the place of the old fields. It is necessary that organized effort be made to develop new fields. It is therefore satisfactory to note that the Geological Survey is undertaking to assist operators in determining what areas are most likely to prove productive. It is to be hoped that the work begun by Mr. Williams this year will be continued. We are sure that operators appreciate the help which such work gives them and that they will heartily cooperate.

### MR. MATHEWSON GIVES A POPULAR ADDRESS ON NICKEL.

"Canada will never lose her pre-eminence as a nickel producer," declared Mr. E. P. Mathewson, manager of the British American Nickel Company, before the Royal Canadian Institute at the Physics Building, University of Toronto, on Saturday, Nov. 24.

Mr. Mathewson gave an interesting resume of the history of the industrial development of nickel from its earliest stages to the most modern refining methods. The speaker declared that over 80 per cent. of the world's output is produced in Canada, and that "no other deposits compare with the nickel deposits in the Dominion."

"Canada is not only a producer of ore, but a refiner," declared Mr. Mathewson, "which will give Canada a higher place in the industrial world." He lauded the work of the commission appointed by the Ontario Government to look into the nickel question, declaring that its report is a "masterpiece in detail and general information, and it has been accepted by the producing and refining experts as one of the best and most complete compilations ever published."

The lecture was illustrated. Many excellent views of nickel mining developments were shown. Mr. J. Murray Clark, president of the Institute, presided.

It is reported at Kamloops that a find of copper ore has been made in the same part of Kamloops mining division as the Iron Mask is situated in, and distant from that mine two or three miles. The Iron Mask has been a producer of copper ore for many years, though not in anything like such large quantity as it would have been had there been suitable reduction works established close at hand. However, it is expected that eventually conditions in this respect will be improved.

### WILL FRANCE AND BRITAIN EXCHANGE CERTAIN OF THEIR COLONIES.

The importance of New Caledonia as a producer of nickel and chrome, and formerly of cobalt, makes the following article of special interest to mining men. The article is translated from a recent number, Aug. 25th, 1917, of *Le Bulletin du Commerce*, published at Noumea, New Caledonia. W. G. M.

Is it the intention of France and England to profit by the war to exchange a certain number of their colonies in different parts of the globe? Although the question has not as yet attracted the attention of the general public, it has been plainly placed recently before British colonial opinion.

The manner in which it has been received is significant enough. The journal "The New Europe" has taken the initiative by proposing a kind of general regulation of accounts. On 12th April last it recommended an arrangement which would consist essentially of extending French territory in West Africa in exchange for compensations granted to Great Britain and her Dominions in other parts of the world. France would obtain, in whole, or in part, Gambia, Sierra Leone, Togo, and perhaps even the Gold Coast. She would relinquish Saint Pierre and Miquelon to Newfoundland; Tahiti and the Marquise islands to New Zealand; the New Hebrides to Australia; and to India (i.e., to England herself), the principal French settlements of India. The same journal even sets forth the eventual ceding to Australia of New Caledonia, its wealth in nickel, according to the journal, having lost its importance to France since the discovery of the large Canadian deposits.

The plan as a whole meets a lively enough opposition in British colonial centres. For the moment we shall confine ourselves to pointing out these trends of opinion. What is even now certain is that, if a part of the English colonial world seems to be truly little in favor of a readjustment of the French and English colonies, on the other hand, any agreement, exclusively economic, would be warmly received. It is not unreasonable to hope, for example, that the French and English interests in West Africa could be brought to agree to a joint policy for shipping and railways. It is in this direction that, in default of eventual exchange of territories, fruitful solutions will undoubtedly be found.

The Vancouver Daily Province stated lately that "at the request of the Dominion Advisory Council of Scientific and Industrial Research, Dr. J. G. Davidson, head of the Department of Physics at the University of British Columbia, was leaving Vancouver for Ottawa to superintend the installation of a by-product coke oven plant in Eastern Canada. He will be away from British Columbia several months. Dr. Davidson stated that for three years he had experimented with the application of an electrical method of cleaning smoke and dust from gases, and extracting smoke from coal gas in gas plants and by-product ovens. The object is to eliminate in new plants much of the machinery used in the older ones. Dr. Davidson pointed out that the importance of coal tar, on account of its derivatives, benzol and toluol, had been realized by the United States Government in its war preparations to such an extent that manufacturers of machinery had been asked to give precedence to making equipment for by-product ovens.



## Molybdenite at Falcon Lake, Manitoba

By J. S. DeLury.

Considerable interest has been aroused recently in Manitoba by several reports of discoveries of molybdenite in the province. It has been known for some time that this mineral occurs at Herb Lake, to the northeast of The Pas, in a quartz vein associated closely with a granitic intrusion. It has also been noticed recently as a prominent constituent of a chalcopyrite-quartz ore-body which is being opened up on the east shore of Lake Winnipeg near the mouth of the Hole river. During the past summer several claims with showings of molybdenite have been staked near Falcon lake. A description of the area adjacent to these claims together with some notes on the occurrences of the molybdenite follows.

Falcon lake is nearly eight miles long and averages about one mile in width. The Ontario-Manitoba boundary is near the east end and the molybdenite claims not far from the west end of the lake. Lying only a few miles from and between the Canadian Pacific railway to the north and the Greater Winnipeg Water District railway to the south, the claims are easily reached by canoe and trail from Ingolf on the former railway and from a point on the latter where it crosses the Falcon river.

The area immediately adjacent to the molybdenite prospects has not been geologically mapped, though an area lying a short distance to the northeast, the Star Lake District, was described and sketch-mapped by Wallace in the Report of the Public Utilities Commission of Manitoba for 1916 and another area east of the Ontario boundary by Parsons in the Annual Report of the Ontario Bureau of Mines, Part 1, 1912. The accompanying sketch-map is an enlargement of Wallace's Star lake map to include the molybdenite area and to show the prominent rock-outcrops and the approximate geological boundaries in the vicinity of the claims.

The country is forested, but good rock exposures are found on many comparatively bare ridges. Pre-Cambrian rocks occupy the whole area for miles around and their relations are rather complex, but it is hoped that a few general remarks concerning the prominent rocks, supplemented by the map and vertical section, will make clear at least sufficient of the geological relations to explain the occurrence and origin of the molybdenite.

Long and relatively narrow belts of Keewatin rocks occupy troughs in a complex of granites in this and adjacent areas. The Keewatin belt, which is of interest in connection with the molybdenite deposits, is indicated on the map. It consists mainly of old basaltic lavas, some of them showing pillow structure and others grading into agglomerates, with here and there small bands of a light-colored rock which in some places suggested quartzites and in others felsites. These old basalts have been changed by folding and shearing, and by intrusions of granite, so that now they appear as schistose metamorphic rocks; the most prominent type being a chlorite hornblende schist. This schist stands nearly vertically in most places where it was observed and strikes parallel with the granite contacts, or roughly in a northeasterly direction.

At least two, but possibly more, granite masses have intruded this area. An early gray granite is prominent in the district; it is seen to be the older as it has in many places a pronounced banding and besides it has been intruded by a second granite, a red variety which shows little or no banding. Connected with this

later red granite, or possibly with a still later intrusion, are some pegmatites and aplites which appear in the granite complex and in the schist for some distance from the contact with the granite. The intrusion of these acid phases of the granite is the important geological event in connection with the formation of the molybdenite deposits. The relations between these various rocks are brought out in a general way in the vertical section across the contact accompanying this paper.

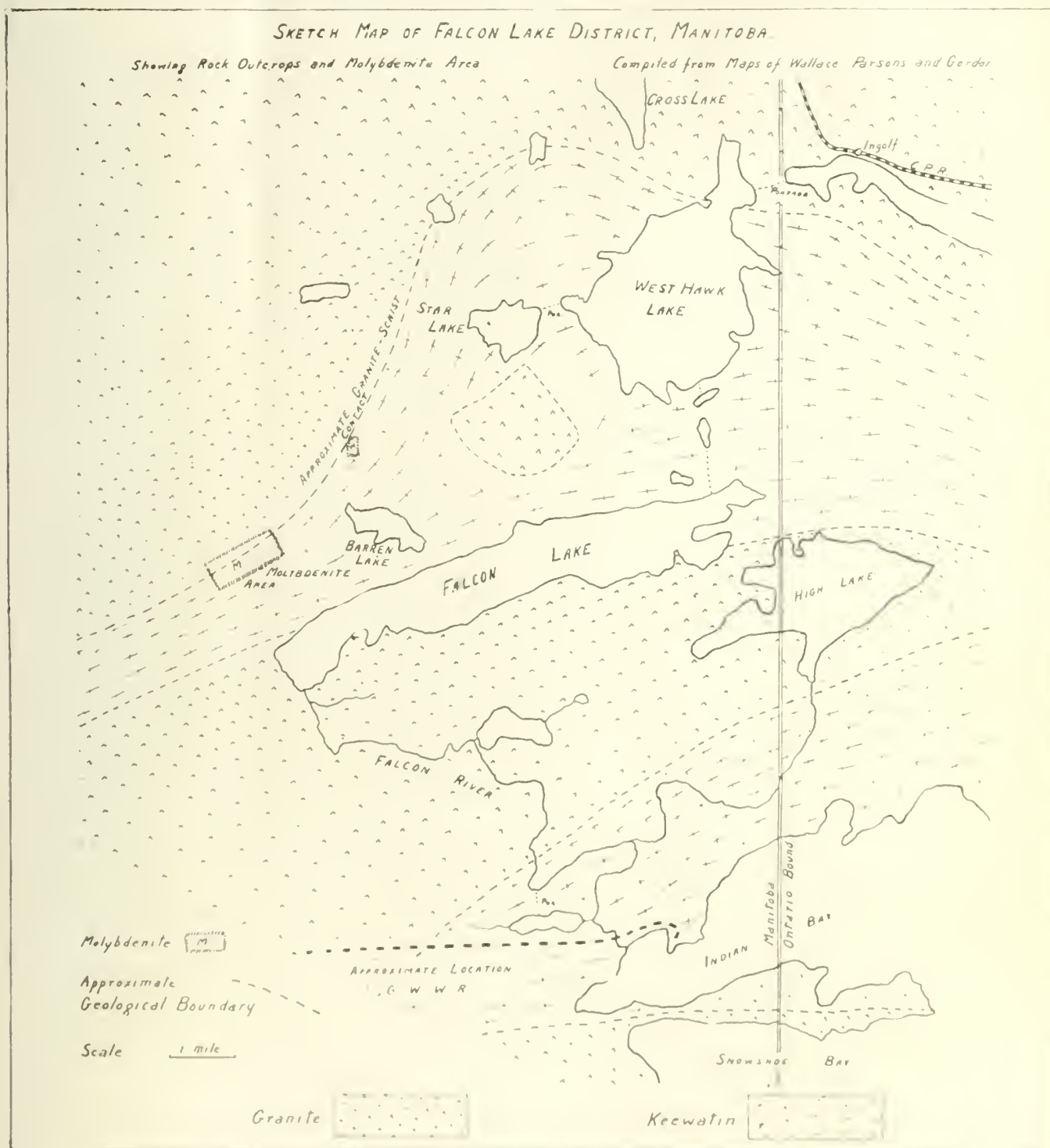
The pegmatite dykes, which are of interest in connection with the molybdenite, lie in the schists parallel to the granite contact, as a rule, but in places they cut the schists at small angles and minor pegmatitic masses cut the cleavage planes of the rock at almost right angles. The dykes in the vicinity of the molybdenite prospects are confined to a band of the Keewatin about a half mile wide running parallel with the contact and adjacent to it. Typically the dykes are from two to ten feet wide and occur commonly in groups or pairs. Commonly they have a lens-shaped form and may be split more or less by bands of schist. Individually the dykes do not appear to be very persistent in width; but on the other hand there is a persistent zone of dykes, many of which are almost joined. Some individuals might be traced several hundred feet; but there was insufficient stripping to decide this point positively. Larger masses of pegmatite occur in the district. Near the smaller molybdenite area, as indicated on the map, is a wide, rather irregular mass of pegmatite made up of large feldspar crystals, some of them as much as a foot in diameter, in a matrix of quartz carrying abundant small muscovite crystals. There were no signs of molybdenite in this mass.

The pegmatites vary in texture from coarse-grained varieties with large crystals and masses of mineral up to several inches in diameter to fine-grained types which grade in places into graphitic granite and aplite. The prominent minerals of the dykes are quartz and feldspars with minor and varying amounts of muscovite mica, which is never in commercial sizes. Small red garnets are common and are abundant in places in the fine-grained pegmatites and in the aplite. Beryl crystals were noticed in two places; but they do not appear to be abundant. In the pegmatitic mass, apparently as an original constituent of the rock, is molybdenite occurring in a variety of forms. Irregular prismatic crystals up to two or three inches in diameter and coarse radiating groups of lamellae of even larger size are found distributed here and there through coarse and fine-grained pegmatite. Fine-grained massive specimens were found in one place in a massive quartz phase of the pegmatite. Small grains and lamellae are present in parts of the aplite.

On one of the claims in the main group a small dyke cuts across a vein of reddish quartz which is from two to three feet wide and lies parallel with the schist. In this quartz vein, within a few feet of the dyke, are cross-fractures which carry lamellae of molybdenite. This is the only occurrence noted in the district where the molybdenite is secondary in the rock. Another occurrence of special interest was seen on a claim located in the smaller area as indicated on the map. Here a quartz vein from two to three feet wide, carries along the walls numerous feldspar crystals and small masses with an occasional lamellar mass of molybdenite. The molybdenite content of this vein is small, but the occurrence of bismuth in small grains in the quartz is of some interest, especially as it was not noticed in any of the true pegmatites.

Before discussing the molybdenite content of the dykes it seems worth while to suggest that the mineral, owing to its softness and toughness, is not apt to make a good showing on the weathered surface for the reasons that ice-action would tend to pluck out and to wear away the molybdenite from the surface. Any that might be spared this erosion would be apt to be

could only come from those parts of the dykes which had been opened up by blasting. In practically all of these pits crystals and masses of molybdenite, commonly one, two and three inches in diameter, were exposed. The showings were much better in some openings than in others. At one point where a shot had been put in exposing about one square yard of fresh pegmatite, three crystals of molybdenite were



weathered out later or at least disguised by alteration products. In support of this view is the fact that openings made in the dykes have invariably made better showings than would have been deemed possible from the aspect of the unbroken surface. Though molybdenite masses, usually small ones, were seen on the surface in several places, evidences of quantity

exposed, which taken together, it was judged, would weigh from one half to one pound. In the blasting out of seven or eight cubic yards of the dyke rock, twenty or twenty-five pounds of loose crystals and masses were gathered, while in the large unbroken blocks of rock piled on the dump, could be seen many more.



The prominent type of occurrence of the molybdenite is in large crystals and lamellar masses which could be readily hand-picked into an almost pure product. There is another type which if found in sufficient quantity would be of economic importance: the fine-grained variety as found in aplite.

The nature of the ore makes sampling out of the question in the present state of development of the properties. It would be necessary to crush large masses of ore in order to get a fair sample and insufficient material has been thrown out to give this quantity. It was judged from results of a hasty examination that the molybdenite content of the pegmatites would lie between one or two tenths of one per cent. in some cases to possibly one per cent. in others. It is possible that higher grade deposits will be brought to light with further work in the district. The showings are such that would warrant further prospecting on the claims and generally throughout the area in the vicinity of the granite contacts. The facts that granite contacts are many in the district and in adjoining parts of Ontario and that molybdenite has been reported from different parts of the Lake of the Woods country give weight to this conclusion.

It may be of interest in connection with the Keewatin belt which carries the molybdenite prospects to call attention to the general mineralization of the belt. Many claims have been staked. The principal locations are on quartz veins, many of which carry gold and such sulphides as pyrrhotite, pyrite, arsenopyrite, chalcopyrite, galena and sphalerite. Magnetite is prominent in the schists in places and is associated with chalcopyrite in others. A wide band of schist, carrying pyrite in small veins and as disseminated grains and crystals, strikes with the schist and is traced for considerable distances to the east and to the west of West Hawk Lake.

### THE STRIKE AT TRAIL.

Victoria, Nov. 16.—Fifteen hundred employees of the Consolidated Mining and Smelting Company, at Trail, have gone on strike, according to information reaching the Provincial Government yesterday morning. In consequence, work at the big smelting plant, which handles the ore from the mines in that important mining section of British Columbia, is seriously interfered with. The men who have gone out on strike, are what are known as the chainmen, that is, helpers, and some other branches. The smelter men proper, it is said, are not on strike.

Nelson, B. C., Nov. 15.—The strike at the Consolidated Company's Trail smelter occurred when the men demanded that the masons, electricians, yard workers, carpenters and mechanics at the plant be given an eight-hour day in place of nine. The demand was received by the company last night through the Trades and Labor Council with the statement that the strike would be called to-day unless it were acceded to. The strike occurred this morning, all the men quitting in a body. About 450 of the 1,500 workers at the smelter are affected by the demand for eight hours. Negotiations with a view to a settlement have started, but without any result so far. The company had an agreement with the local union of the Western Federation of Miners, and states that if it had dealt with the Trades and Labor Council it would have broken that agreement. The men contend that they are entitled to the eight-hour day.

### GRANBY CO.'S OPERATIONS.

The November number of the Granby News, as also did earlier issues, contains interesting news of Granby properties, including informative contributions by several of the company's officials, news from its several centres of activity, and miscellaneous information also of interest. The following items have been taken from the News Notes from Phoenix and Anyox:

**Phoenix.**—Due to further coke shortage, all shipments were cut off from September 19th to the end of the month. During this period the mine was worked intermittently. Many of the men found this to be a good opportunity to lay in their supply of wood for the winter, and the right of way along the auto road to Grand Forks was at times a scene of activity, being the favorite and most productive area in the cordwood line.

Word was received on October 24th that work had again stopped at the Coal Creek coal mines, near Fernie, whence comes the coke supply for the company's smelter at Grand Forks. Unless coal-mining operations shall be resumed at once, inactivity at the smelting works will result, as the supply of coke on hand is sufficient to last only until November 1st.

The average daily wage paid Granby employees in Phoenix during August and September was \$4.75.

**Anyox.**—Mr. Walter Noble, of the general office staff, has resigned his position, and is leaving Anyox this month to join the Canadian forces.

Work has been started in connection with the installation of a battery of thirty coke-ovens. The site has been cleared and a gang of men are busy getting out timber for foundation and cribbing purposes. It is intended to do all the preparatory work possible this fall. The dock and bunkers will be built, so that next year, as early as the weather will permit, the ovens can be started and the plant be ready for operation before the following fall.

Alterations have been commenced on the auxiliary steam power plant, where it is the intention to move the auxiliary plant boilers closer to the power plant, put an extension to that building and have them all under one roof. This will make the operation of both plants more economical. The building addition will be of frame construction with a coating of gunite.

A shipment of 1,000 tons of copper pyrites has been made from the Hidden Creek mine to the Nichols Chemical Company, Barnet, B.C., where sulphuric acid is made. Heretofore this raw material has been brought from California.

The brickwork on the furnace settling chamber extension is completed, and, as soon as the No. 4 down-take is moved the furnace will be put into operation.

Construction was commenced this month on the addition to rooming house "B." Fifty more rooms will be made available by this addition.

Work on the brick structure of the converter chamber is in progress.

The roof is almost complete on the new converter building extension and the painters are busy giving the final coat.

The experimental mill put in operation the three shifts on Sept. 22nd.

# Oxygen Mine Rescue Apparatus

By F. W. Gray.

The mining profession is once more indebted to the United States Bureau of Mines for a well timed Bulletin. The result of the latest enquiry of the Bureau is contained in Technical Paper No. 82, prepared by Dr. Yandell Henderson and Mr. James W. Paul, formerly chief of the Department of Mines of West Virginia, and from 1908 to 1915 in charge of the mine rescue work of the Federal Government of the United States, and deals very thoroughly with the characteristics of existing types of oxygen mine-rescue apparatus, their limitations, their possible improvement and their physiological effects on users.

Dr. Henderson, as Professor of Physiology in Yale Medical School, is a physiologist of repute, and in his knowledge of the physiology of breathing, occupies a place in medical circles in the United States comparable to that occupied by Dr. John Haldane in Britain. Mr. Paul's record is well known to all who followed the progress of the use of oxygen breathing apparatus on this side of the Atlantic, and his researches cover the entire period during which oxygen apparatus has been used in connection with mine rescue work on this continent. The writer brought one of the first—if not the first—Draeger apparatus to this side in October, 1907, and it was about this time that the United States Bureau of Mines commenced its investigations.

The findings of the authors of this Bulletin may therefore be regarded as embodying the result of the widest experience, under wide variations of circumstances, and as being free from preconceived ideas or the bias which has in the past militated against the development of oxygen breathing apparatus as applied to mine operations.

As is pointed out by the Engineering Supplement of the "Times" the enquiry of the U. S. Bureau of Mines covers the same ground as will have to be covered by the committee recently appointed by the Department of Scientific and Industrial Research in Britain, the duties assigned to this committee being: "to enquire into the various types of breathing apparatus used in coal mines, and by experiment to determine the advantages, limitations and defects of the several types of apparatus, the improvements possible in them, and the advisability of standardizing the types used in mines." No doubt the British Committee will avail itself of the accumulated experience of our U. S. friends, and in this, as in other matters, there will in these days of closer approach, be no hesitation on the part of the British investigators to collaborate with the Bureau of Mines.

The Bureau of Mines of the United States is an institution having features that should commend themselves to those who urge a Ministry of Mines in Britain, and to those who have urged the necessity for an extension of the work of the Department of Mines in Canada. However, we are so far fortunate that we may avail ourselves without charge of the researches of the U. S. Bureau, and in the present instance, as in others that have preceded it, the mining profession of Canada will appreciate the international courtesy which extends the free distribution of literature of the Bureau to ourselves.

The author points out that at the present time the apparatus sold in North America, consists mainly of

three types—the Fleuss or Proto, of English manufacture, and the Draeger and the Westfalia, made in Germany. In their broadest features these three forms of apparatus are identical, and the authors consider it probable that "all future apparatus will have to be built on fundamentally similar lines."

The essential features of the three main types of apparatus are, (a) a breathing bag, (b) a supply of compressed oxygen, and (c) the provision of some alkaline substance to absorb carbon dioxide.

The authors do not consider the liquid air apparatus or devices of the "pneumatogen" type offer much prospect of future development.

The most interesting feature of the Bulletin is the announcement that the Bureau of Mines has itself undertaken to develop an apparatus that shall embody the good and essential features of the three main types of apparatus in use, and eliminate the defects so clearly revealed by the enquiry. The chief defect of the breathing apparatus hitherto used is, in the opinion of the authors, its failure to respond quickly to the tremendous variations in the rate of breathing and the consumption of air which accompanies the performance of violent work by individuals of varying physical type.

This lack in the typical apparatus was, many years ago recognized by Sir W. E. Garforth, the inventor of the "Weg" apparatus. This apparatus was fitted with an automatic oxygen feed valve, and was an early endeavor to meet a recognized need.

The new type of apparatus developed by the Bureau of Mines is the result of two years' work by Mr. W. E. Gibbs, a mechanical engineer of experience and skill, assisted by the authors of the Bulletin, and it differs from the standard types particularly in respect to three features, namely:

"(1) The control of the oxygen supply, (2) the arrangement of the alkaline absorbent, and (3) the prevention of excessive heat from the reaction between the carbon dioxide exhaled and the alkali."

"The rate of oxygen supply is automatic. The wearer of the apparatus breathes into and from a small bellows. When the bellows is sucked flat a valve is opened, which allows oxygen to feed in rapidly from the compression tank, through a reducing valve of improved design. Thus, the rate of oxygen supply is automatically controlled by the wearer's breathing, and, as tests have shown, adjusts itself with equal readiness and adaptability to his needs during rest, when the consumption per minute is only 300 to 400 c.c. and during vigorous exertion, when it is between 2,000 and 3,000 c.c. per minute."

The authors condemn, without qualification, the use of helmets, because of the "dead space" they contain, the great difficulty in keeping them tight, and preventing accumulations of carbon dioxide within the helmet portion of the breathing circuit.

The use of an injector such as is employed in the Draeger and Westfalia apparatus is condemned. The authors are convinced of the dangers of apparatus of the negative pressure type and consider a positive pressure is desirable, but not to exceed a pressure at the mouthpiece of more than 5 centimeters (2 inches) water gauge even during the most forcible expiration.



The authors lay great stress on the necessity for complete absorption of carbon dioxide from the breathing air, and at the suggestion of Professor Henderson, trial has been made, instead of fused alkali, as in the Fleuss, Draeger and Westfalia types, with alkali containing a small percentage of water of crystallization, approximately 1 per cent., or one molecule of water to two of hydroxide.

The avidity of the alkali for moisture being thus already partly satisfied, the amount of heat produced is considerably less than in other forms of apparatus and the alkali is efficient at a much lower temperature.

The importance of keeping down the temperature of the regenerator cartridges is well known to those who have had occasion to use breathing apparatus under such conditions as, for example, those attending a mine fire. At the Sydney Mines fire in 1908 the cartridges became so hot as to burn the backs of the men who were wearing the apparatus.

The authors point out the insidious effects of breathing air defective in oxygen and quote the results of some simple but remarkable experiments showing how quickly, and with what little warning a man may collapse under these conditions.

The following account of one of these experiments may be quoted from the Bulletin:

"A young man was set to perform an experiment to determine the rate of oxygen consumption at various rates of work on a stationary bicycle. By means of a mouthpiece and tubing he breathed from and into a large gasometer through a can of soda lime, which absorbed the carbon dioxide exhaled. Instructions were that the gasometer should be filled with oxygen at the beginning of the experiment, but through a mistake it was filled with air. After a minute's vigorous exertion on the bicycle the oxygen percentage had been so much reduced that the subject, who had no suspicion that anything was wrong, suddenly lost consciousness and fell off the bicycle, twitching and kicking as in a convulsion. In a few minutes, after breathing fresh air, he recovered consciousness and seemed none the worse except for a slight headache. He had no recollection of what had happened."

The effects of breathing insufficient quantities of oxygen and those of breathing carbon monoxide are very similar, and the great danger that accompanies these conditions is the impairment of discretion and judgment which precedes the lightning-like suddenness of the eventual collapse.

The authors very properly point out the dangers inherent in the use of rubber in breathing apparatus, particularly in the dry atmosphere of North America, and especially in mining camps situated in an elevated region such as the Western and Northwestern States.

The authors make the following very serious statement:

"The inspection of the helmets kept to-day at various mines in America awaiting a mine accident, indicates that if ever used they are more likely to contribute to the loss of life than to decrease it." Unfortunately there is every reason to believe the statement of the authors to be only too accurate, and during the past ten years the writer has in the columns of the "Journal" repeatedly emphasized the fact that unless breathing apparatus are kept in good condition and worn only by trained men, their use under conditions of danger is an invitation to disaster."

In an article written for the "Journal" some years ago the writer likened mine rescue apparatus, and the

necessity for using it carefully, and keeping it in good order, to the rifle of a soldier; or to the use of the aeroplane, and in this connection the opening paragraph of the Bulletin puts the case very lucidly, to quote:

"Self-contained breathing or rescue apparatus, often popularly referred to by simple but misleading term 'oxygen helmet' is a device by which man is enabled to do work in places where he is by nature unfitted to go, to live and to work. In this respect mine rescue apparatus may be classed with the aeroplane and with diving apparatus, including the submarine boat. The loss of life that has attended the development of the aeroplane and the submarine is well known: the loss of life in the development of oxygen apparatus for use in asphyxiating gases is not so generally realized. That such development is accompanied by fatalities is not surprising, because penetrating the smoke-filled passages of a burning mine is quite as abnormal as for man to ascend into the air or to navigate and explore the water below the surface of the sea."

The main conclusions of the Bulletin may be quoted in extenso as follows:

"The helmet of the type used with the Draeger and the Westfalia apparatus should be entirely discarded. Any device of this type which may be invented in the future should have a 'dead space' not exceeding 200 c.c., and should be tested with the utmost care as to its tightness upon the face.

"A self-adjusting valve should replace the fixed feed valve. Whenever the fixed-feed valve is used it should be set to a flow of not less than 3,000 c.c. a minute as a minimum, measured at 60 deg. F., and a barometric pressure of 30 in.

"The arrangement for artificial circulation in the Draeger and Westfalia apparatus should be eliminated and replaced by a natural circulation, but when those appliances are used in their present forms the automatic circulation should be not less than 75 litres a minute. The injector should be placed between the exhalation bag and the absorber so as to decrease to the smallest possible limits the area in which a negative pressure occurs.

"The weight of the whole apparatus should not exceed 35 lb.

"The absorption of carbon dioxide should be so nearly complete that the air in the circulation system during moderate exercise will not contain more than 0.5 per cent. of carbon dioxide, and at no time, even during the most vigorous exercise, more than 1 per cent. The absorber should be capable of fixing at least 2.5 litres of carbon dioxide a minute.

"A by-pass valve should be made a part of the apparatus, to be used in case of failure of the reducing valve, for refilling the breathing bag in case it is pressed flat, and for renewing the air contained in it in the event of poor absorption of carbon dioxide.

"An automatic relief valve that can also be operated by the hand or finger should be provided and placed on the exhalation bag.

"The inhalation and exhalation bags should have a combined capacity of at least eight litres, and if a single breathing bag is used its capacity should be at least five litres.

"The breathing bags should be protected against accidental compression when the wearer is crawling through a low passageway.

"The air within the circulating system should at all points be under a positive pressure not exceeding 1 c.m. water gauge, to ensure that any leakage that may occur shall be outward, not inward

"All tubes and valves should be sufficiently large to permit the breathing of 100 litres of air a minute without undue resistance, with a positive pressure not exceeding 5 c.m. water gauge and no negative pressure even during the deepest and most rapid breathing.

"Pressure gauges should be regularly tested in comparison with a standard instrument. They should be calibrated in atmospheres and also in minutes of duration of the remaining oxygen supply, and should be placed where the wearer can easily see them, or be provided with some device that will warn him that the supply is nearly exhausted.

"Couplings and connections should be reduced to the smallest number possible and made strong enough so that even a heavy blow will not dislodge them, cause them to leak, or compress them so that the air cannot pass freely through them.

"The production of heat in the absorber should be reduced to a minimum, and an efficient radiating or cooling device provided.

"Parts of the apparatus worn on the back should be protected against damage when the wearer is travelling under a low roof. The valve regulating the oxygen supply, which in some forms of apparatus now projects to the side, should be protected against accidental closing."

The authors make but one slight reference to the use of breathing masks and respirators in the war. The use of gas masks at the front has a different object from the use of oxygen breathing apparatus under the conditions which are found in attendance on mine fires and after mine explosions. In the mine the difficulty is usually the absence of a sufficient percentage of oxygen to sustain life, whereas in offensive operations of the war the object is to remove from the air the poisonous gases which have been diffused throughout the atmosphere. There is here a considerable analogy with mine air, not necessarily deficient in oxygen, but containing a poisonous percentage of carbon monoxide.

There is no doubt that in some cases life could have been saved after mine explosions by the use of a simple respirator with the power of absorbing carbon monoxide, and there is some possibility of development and invention along these lines.

The use of gas masks, and also of oxygen breathing apparatus, has attained proportions during the war previously undreamt of. Many thousands of men, among them miners previously trained in the use of oxygen breathing apparatus, have during the war had experiences, which, when they are collated and made the subject of investigation after the war, will, it seems very probable, add greatly to our knowledge of both the physiological effects and the psychological effects of the use of oxygen breathing apparatus.

In the Allied countries and also in Germany, it is probable that the manufacture of gas masks and oxygen breathing apparatus for war purposes has entirely overshadowed the uses of these devices in peaceful pursuits, and in considering the future development of oxygen breathing apparatus as applied to mining operations, it seems quite probable to anticipate that the experiences of the war will exercise no small effect.

The work of Messrs. Henderson and Paul is the most important contribution to the literature of mine rescue apparatus that has appeared in many years. It holds out the hope that the mining profession may be freed

from the often offensive pressure of the claims of manufacturers of rival apparatus, and that there may some day be available an apparatus which will combine all the good points of the standard types, while avoiding their defects.

In view of the unmitigated condemnation which mine rescue apparatus has met with in some quarters, it is encouraging to those who have always believed in the usefulness of these devices under proper supervision, to note the account of the accomplishments of the Bureau of Mines Rescue Corps since its formation.

During the seven-year period from January 1st, 1908, to January 1st, 1915, the Bureau Rescue men had attended a total of 283 mine disasters in which 2,700 lives were lost. Rescue apparatus was worn by 699 men; 92 miners were saved by apparatus men in the service of the Bureau; 768 were saved by other rescuers and 1,426 miners escaped unassisted.

In this connection it may be mentioned that the Draeger apparatus was used to a limited extent after the explosion at No. 12 Colliery of the Dominion Coal Company in July last. The undoubted suddenness with which death came to all the victims of this explosion gave little or no opportunity for rescuing life.

The majority of the victims died from the burns or shock inflicted by the concussion of the explosion, and those who died from monoxide poisoning can only have lived a few minutes. The apparatus was used for exploratory purposes, and two men traversed the greater part of the explosion area—before the ventilation was restored—with the aid of the apparatus. The saving of the lives of two men who were assisted out to fresh air by men wearing the Draeger apparatus was certainly in large measure, if not entirely, owed to the use of these apparatus.

It cannot be too often stated that the conditions which attend coal-mine explosions, particularly in large well-ventilated modern collieries, are such as to preclude the hope of rescuing any large number of victims alive.

The term "rescue apparatus" is an unfortunate one, and is responsible for many misconceptions of the true uses and the obvious limitations of any device of human ingenuity in the face of the elemental forces of nature which are unloosed with such overwhelming violence in a coal mine explosion.

For reconnaissance purposes, as an adjunct to a colliery fire brigade, for use in the recovery of an exploded mine, building stoppings, restoring ventilation and as the "avant courier" of the rescue parties, oxygen breathing apparatus has its well recognized value, but it is not a universal panacea, as some people seem to think. Breathing apparatus are nicely regulated, delicate mechanisms, not yet fully developed to perfection, and they must be used with discretion and by trained wearers of good physique with other essential qualifications of courage and intelligence.

The Bulletin should be read by every one interested in mining operations.

The Highland Valley Mining and Development Co., operating in Ashcroft mining division, is reported from Spokane, Washington, where its head office is situated, to have produced in October about 150 tons of concentrate estimated to run from 20 to 24 per cent copper. Mr. Frederic Keffler is manager for the company.



# The Mackenzie River Basin

## The Canadian Last West

By Gerald M. Ponton.

Love of the romantic is inborn in man. What is more romantic than the truth? What is more interesting than to learn that some district till now thought of as a wilderness is in reality accessible and quite a habitable zone? Several months ago there appeared in the Atlantic Monthly an article from the hand of an Edmonton professor, picturing all that district to the north of Edmonton as the frozen north, a land of endless snows, snow-shoes, dog-sleds, trappers and Indians and wild animals. What a description. Is it wrong to destroy such pessimistic "idealism" by bringing out the fact that this great North, and last West in truth, is a land with wonderful resources, beautiful climate, millions of acres suitable for farming and withal not one whit less romantic because this is true.

What a time we Canadians had living down "Our Lady of the Snows." Is Canada less romantic as the "Granary of the Empire?"

The history of this north to the present from the advent of the white man at the end of the eighteenth century, can be mainly summed up as an era of the fur traders and slow settlement. It is difficult indeed to find an unbiased historian of the pioneers of this far north; but all tell of glorious adventure and achievement by men endowed with the spirit of "The Fore-looper" of Kipling.

"The gull shall whistle in his wake, the blind  
wave break in fire,  
He shall fulfill God's utmost will unknowing  
his desire,  
And he shall see old planets pass and alien  
stars arise  
And give the gale his reckless sail in shadow  
of new skies.  
Strong lust of gear shall drive him out, and  
hunger arm his hand  
To wring his food from the desert nude, his  
foot-hold from the sand,  
And his neighbor's smoke shall vex his eyes,  
their voices break his rest,  
He shall go forth till south is north, sullen  
and dispossessed,  
And he shall desire loneliness, and his desire  
shall bring  
Hard on his heels a thousand wheels, a people  
and a king.  
And he shall come back in his own track and  
by his scarce cool camp  
There he shall meet the roaring street, the  
derriek and the stamp,  
For he must blaze the nation's ways with  
hatehet and with brand  
Till on his last won wilderness an empire's  
bulwarks stand."

The names of Alexander Mackenzie and Simeon Fraser will always be associated with the Canadian West as are the names of Lewis and Clark with the American North-West. Mackenzie and Fraser explored and at the same time established settlements and forts along the entire line of their explorations. The rapidity and permanency in which they did their work would be a marvel even in this generation.

Perusing the histories of these early Empire makers will bring many a delightful hour. Especially readable are the diaries, which have the human touch. The diary of blunt Samuel Hearn in his attempt and final success in reaching the Coppermine river is an epic. A Canadian historian states with regard to the history of the last 50 years of Canada: "In one sense it is not a dramatic tale; it has little of the ceremonial of Old World movements. But, none the less, it is a profoundly romantic story of the birth of a nation and of its passing from neglected obscurity into a conspicuous place." How true of the North.

The opening of 1916 was concurrent with the arrival of the Edmonton, Dunvegan and British Columbia Railway (E. D. & B. C. Ry.) at Peace River Crossing. Linking the outside world with all this Far North; linking the system of Great Waterways, the Saskatchewan, Athabasca, and the Peace with its supplements the Slave and the MacKenzie, this last Trinity indeed a great waterway. What luck it was that this railway with its companion the Alberta & Great Waterways Railway was planned, financed and started before the war and has been finished (has at least tapped the North) during the struggle. What a God-send it will be to those returning veterans with their well-earned land grants, and emigrants from war-ridden Europe, who will flock to the hemisphere where war has no place. The settlement of the North in the last few generations took place along the rivers and lakes and was thus restricted. The railway striking across country, with roads and trails being built, gives a greater chance for efficient settlement. A satisfied settler is a missionary agent.

Previously, supplies of food and barter went northward in winter only from Edmonton, and like points, while the roads were hard, and lakes, rivers and muskegs frozen, to the various trading posts and settlements. Thence it was carried in summer by boats to posts further up or down the rivers. The outgoing freight was then entirely furs, the result of barter.

Now it is quite usual to see farming and mining machinery, as well as food supplies, and less and less trading stock, go north by railway. We see the train denuded gradually of its load at sites of towns to be. Now on the rivers we see grain-loaded scows floating down to the nearest shipping point. On the trails we meet herds of cattle outward bound.

A lasting impression from a trip to the North is the picture of one of the old established Posts, situated at a crossing or ford of a river, the junction of rivers, or the end of a lake. Always the site was wisely chosen. We view from the distance three separate groups of whitewashed buildings, one-quarter to one mile apart as the case may be. On closer view the first group asserts itself as several solidly built log buildings, one at least of two stories. Adjoining these are corrals and stables. Conspicuously placed is a large flag staff with a Union Jack flying, pathways and roadways are lined with whitewashed boulders. About the buildings we glimpse men in uniform, and we know this to be a R. N. W. M. P. Barracks—the headquarters of a detachment of that body of men whose record for efficiency in the prevention of crime.

and of bringing the wrong-doer to justice, has never been equalled.

The second group is now in full view, its buildings are more elaborate and substantial than either of the other groups. Large fenced-in gardens surround them on every side. From the large cross displayed on the buildings we recognize the Roman Catholic Mission, often of French origin. These establishments founded and carried on by representatives of that church which has led the world as missionaries, who are as much at home on the forest trail as in the teeming cities. The priest, with his instilled knowledge of psychology and with his picturesque, ceremonious religion succeeding where his brother priest of a rival church fails.

Assuming that we are travelling by water we find that we are going to land near the third group. Prominently displayed on some building we note the legend "The Hudson's Bay Company." Perhaps on

black, cinnamon, and the silver tip and grizzly in the foothills and mountains, are in their element and the many smaller fur-bearing animals are trapped successfully. Game birds, and especially ducks and geese, make this a hunter's paradise. The rivers and lakes teem with fish; the lakes with that greatest of all commercial fish, the white-fish. It is to be hoped that the fisheries will be protected to the full and that the piracy that existed in Eastern waters will be prevented.

#### Mineral Resources.

Until further accurate knowledge is gained the resources of minerals can only be lightly touched on. The asphalt or tar sands outcropping along the Athabasca river are especially noteworthy for their extent, and if an economical method of mining and extraction can be evolved, the "Better Roads" movement will make great forward strides. These tars being



Ferry at Peace River Crossing.



Str. "Northland Call" on Peace River.



Hudson Bay landing, Peace River Crossing.



Falls on Hay River.

Photo by A. E. Cameron

Courtesy G. S. C.

the roofs we see displayed "Great Traders of Great West," and always that Coat of Arms of the Gentlemen Adventurers and the motto "Pro Pelle Cutem," variously translated as "A hide for a hide," "We'll skin you for a hide," etc. Loungers that were about the buildings hasten to the landing and we realize that this last group constitutes the common meeting place of the North. For miles surrounding this trinity of forces are many Indian encampments; some of shacks, some tepees, some harboring local tribes, others tribes from a distance who have brought the results of a winter's work to trade, and to receive treaty money. In the hunting and trapping seasons these encampments are deserted.

One can yet in this North shoot for meat. Moose, red deer and caribou abound. Before very long the hunting will be restricted to seasons. The sly bruin,

but a residuum of oil, together with the many natural gas seepages, offer great encouragement to the oil prospector. No doubt oil will be discovered in some broad, well defined dome where the oil has been stored.

The placer deposits of gold of the Upper Peace River have been panned for generations, the gravel bars bringing in a living wage at least. Tales of panings are many and almost fabulous. In years to come gold dredging will be an established industry.

The bituminous and semi-anthracite beds of coal along the Eastern slope of the Rockies are still to be developed. They will doubtless prove as wonderful as their continuations to the south, viz. Jasper Park, Brazeau, Bankhead, Blairmore and like fields.

The Pre Cambrian rocks of Ontario are great producers of metals and it is not impossible that the



Pre-Cambrian plateau in this Northland will bring like results, especially along the contacts. Generally speaking, however, the same degree of metamorphism is not noticeable.

Already tales are coming from the upper sources of the Peace, far beyond the Rockies, of lode deposits of copper, silver, gold, etc.

The Peace River Pass through the mountains at its summit is but 2,500 ft. above sea level. Is there any wonder there is talk of this being some day the main railway route, the outlet for Western wheat to the sea ports?

As a field for geological study this country is perfect; the transmountain passes giving access to the mountains. The deep river valleys present well defined cross-sections. The rivers, flowing opposite to the direction of the general dip of the formations, bring to view successively the rocks of the various ages, making easier the search for fossils. The network of rivers allows the surveyor to determine the extent and axis of anticlines and synclines. Of interest are the "Boccones," especially along the Smoky (thus the name) river; beds of highly carbonaceous shales which have by so-called spontaneous combustion become fired, a matter of superstitious speculation to Indians, and the friend of "wildeat" oil boomers who will have it that oil is the cause of the rumpus. the outcroppings of asphalt, and seepages of natural gas. I have cooked many a meal over a jet of gas issuing from the gravels along the Peace river. Of interest also are the placer deposits and their origin. the coal lands with their multiple system of faulting. to be worked out in detail before extensive operations can be economically started; the uncomfortable contact of the Cretaceous and Devonian and, beyond, the Pre-Cambrian Plateau.

The river valleys are in many places timbered with marketable spruce. Considerable of the upper levels is park land, some open prairie, the balance densely covered with poplar, aspen, etc. In the mountains huge stands of timber are found.

#### **Agricultural Possibilities and Climatic Conditions.**

Relative to the adaptability of this country to farming we can go back as far as 1809. On July 21st of this year while Europe was deep in a war of nations. Daniel Harmon of Vermont, who owned some shares in the North-West Company, at that time a rival of the Hudson's Bay Company and now incorporated with it, wanted to see and thus became a sojourner of the Peace River District, entered in his diary: "We have cut down our barley and I think it is the finest I ever saw in any country. The soil along this river



Falls on Hay River.

Photo by A. E. Cameron

Courtesy G. S. C.

is excellent." On Oct. 3rd of the year following he wrote: "We have taken our potatoes out of the ground and find that nine bushels which we planted May 10th last have produced a little over 150 bushels."

As early as 1843 it was roughly determined that the Isothermal line passing through St. Paul from there turned northward and extended well up into the Mackenzie River Basin. "Spring opening at the same time along the great line of prairies from St. Paul to the Mackenzie river."

In 1875 that veteran Professor John Macoun states of the country west of Peace River Crossing: "It would be folly to attempt to depict the appearance of the country, as it was so much beyond what I ever saw before that I dare hardly make use of truthful words to portray it," and Prof. Macoun was first and last an agriculturist.

Every year each with its substantial increase of acreage under cultivation has proven that this North is eminently suited to farming. It will surely come into its own after the war.

Does not the following brief outline of a summer's outing stir the imagination of those looking for the life of the pioneer. "We took train from Edmonton, having there partly outfitted. Arriving at Peace River Crossing we completed the outfits and next day took boat for Hudson's Hope, the gateway to the Mountains. There, after many pleasant days spent in fishing in the mountain streams, a substantial raft was built sufficient to hold all the outfit, a fire-place was constructed at one end for cooking the mid-day meal if necessary, and the long journey by river was commenced. The outfit included a 16-ft. canoe. Turn about, two managed the raft, while the other two with the canoe explored to their hearts' content. Each morning a pre-arranged distance of travel being decided upon. We shot our first bull moose the second day out. This kept us in meat the whole trip when we were without birds or fish.

"Leaving the grandeur of the Rockies we drifted down to Peace River Crossing and then to Fort Vermillion, some 600 miles further. Fifteen miles below Vermillion we came to "the Chutes," the only restriction to navigation from Hudson's Hope to the Arctic Ocean. Soon we were in the Slave river, then 750 miles further brought us to Great Slave Lake. Crossing this we reached the Mackenzie river and had a straight way to the Arctic open before us. At Fort Norman, much against our inclinations, we stopped and had just a few days' wait till picked up by a Hudson Bay boat. On our return we left the Slave river and



Gorge, Hay River.

Photo by A. E. Cameron

Courtesy G. S. C.

returned to Edmonton by way of Lake and River Athabasca to Athabasca Landing and there took train. We were four months in the open and each day brought its quota of adventure, and every mile some surprise was encountered by reason of the constantly changing scenery."

And all this is the heritage of Canadians, and I have spoken of only one North, while there are many such waiting to be claimed. We must all work together to claim it in a manner that will be permanent, holding it and improving it in trust for future generations.

This true North, this great public domain, will be developed into truly a land of gold, a land of coal, a land of grain, if, with public spirit and progressive encouragement, it is made as it should be, "A land of the Willing Hand."

### PERSONAL.

Mr. J. B. Tyrrell sailed for England on November 14th.

Mr. W. G. Anderson has resigned as manager of the Ore Chimney Mining Co.

Mr. M. Y. Williams, of the Geological Survey, Ottawa, addressed a meeting of the Toronto branch of the Canadian Mining Institute on Saturday, Nov. 24. He told of recent oil discoveries in Ontario.

Mr. H. E. T. Haultain addressed a meeting of the Electrical Club of Toronto on Friday November 23. Prof. Haultain, who is Vocational Training officer for Ontario, spoke on the work being done for returned soldiers.

Mr. R. G. McConnell, Deputy Minister of Mines, has returned from England.

Mr. C. W. Knight, Assistant Provincial Geologist has returned to Toronto after spending the field season in the Sudbury district.

Mr. P. E. Hopkins, who has been mapping gold areas in Northern Ontario, has returned to Toronto.

Mr. W. E. Segsworth is visiting Western cities in connection with the work of the Vocational Training department of the Military Hospitals Commission. He is expected to return to Toronto early in December.

Mr. Geo. C. Mackenzie of the Mines Branch, Ottawa, was in hospital last week for a minor operation.

Mr. Geo. Chapman of the Minerals Separation North American Corporation, who attended a meeting of the Toronto branch of the Canadian Mining Institute at Toronto, and a meeting of the Mine Managers Association at Cobalt, last month, has been at Houghton, Michigan, in connection with the installation of flotation at the White Pine mine, one of the C. and H. subsidiaries.

Mr. Charles O'Connell has resigned as manager of the Tough Oakes mine. He is now managing the Boston Hollinger mine, Boston Creek.

Mr. A. Angus of Cobalt has succeeded Mr. C. O'Connell as manager of the Tough Oakes gold mine, Kirkland Lake.

Mr. E. P. Mathewson gave an address on nickel at a meeting of the Royal Canadian Institute in Toronto on Nov. 21. He will speak on the same subject in Montreal at a meeting of the Montreal branch of the Canadian Mining Institute this week.

Mr. H. E. Miles, chairman of a committee on speeding up production of munitions plants in the United States, addressed the meeting of the Toronto branch of the Canadian Mining Institute on Nov. 21.

Twenty-three vocational training officers of the Military Hospitals Commission attended the meeting of the Toronto branch of the Canadian Mining Institute on Saturday, Nov. 24.

Mr. E. V. Neelands is in Northern Manitoba. His address is care of Bank of Commerce, The Pas.

Mr. A. J. Young is the Liberal candidate in North Toronto.

Mr. G. G. S. Lindsay has been campaigning in Northern Ontario in support of the Government.

### TEMISKAMING AND HUDSON BAY.

President George Taylor in a report to the shareholders of the Temiskaming & Hudson Bay Mining Company, says of operations during the year ending August 31st, 1917:

Work at the No. 1 Mine at Cobalt has been carried on continuously throughout the year, with very satisfactory results. A total of 17,525 tons of ore was hoisted, from which 261,887 oz. of silver, with a net smelter value of \$192,097, was obtained. This silver was produced at a cost of 43½¢ per oz., including selling costs and all charges.

The manager's report shows present ore reserves on a conservative valuation of 107,614 oz. There is every indication that these reserves will be largely increased, and probabilities of new veins being discovered in the favorable formation still remaining to be explored.

The financial statement of the operating company shows a total income of \$190,992, and a total expenditure of \$96,043, leaving a profit on the year's operations of \$94,949. The high price of silver has been of great benefit.

In the Dome Lake Mine at Porcupine work has also been carried on continuously throughout the year. Extensive diamond drilling operations were successful in locating a number of good ore lenses at greater depth, which are yet to be developed. In the cyanide plant installed, the experimental filter drum, which had been put in under guarantee from the maker, proved unsatisfactory and was discarded. Arrangements are being made for the installation of a standard filter to replace this. A change in management was made during the year, and under the present manager work has been proceeding satisfactorily. At present ore reserves are 9,089 tons, with a gold content of \$82,008, and the indications are that this figure will be materially increased during the next few months.

The Hudson Bay Mines Limited has continued to finance the Dome Lake Company by making advances when necessary. Recent reports have been most encouraging, and the directors expect that, with the completion of the cyanide plant by the installation of a standard filter, the Dome Lake property will be on a profitable basis.

No work was done on the other claims, situated at Gowganda and Kirkland Lake, but patents were obtained for the Kirkland Lake properties, and the directors believe that these claims will prove to be very valuable. The Kirkland Lake camp is rapidly developing, and excellent results have been obtained there on adjoining properties during the year. It is the intention of the directors to develop these claims thoroughly.



### A FEW PATENT POINTS.

By Wm. Rieh.

Undoubtedly the greater number of inventors, as well as the public generally, conscientiously believe that the main purpose for which patents are granted is to assist the inventors. This, however, is incorrect. That is not the primary object of the patent system. A patent is not granted for the mere purpose of enabling one man to obtain a monopoly of a certain invention for a term of years to the exclusion of others, but it is founded on a desire to benefit the entire nation.

An inventor is under no obligation to disclose his invention. If new, the public was never aware of it and consequently never had any right to it. It is the inventor's option to divulge it or not, as he pleases. If he does not disclose it the public can never obtain any advantage from it.

The principle was recognized long ago in England where the Statute of Monopolies, enacted in 1623, made all monopolies illegal except those granted by parliament or those in respect of new manufactures or inventions. Upon this last clause is based the English system of letters patent for inventions.

From the above viewpoint, therefore, it is perfectly right and proper to offer an inventor some inducement to disclose his invention so that others may have the advantage of its use, even if they have to pay a price therefor; more, perhaps, than the cost to them if they made it themselves. But why should they not? Is not a man entitled to some remuneration for the work of his brains as well as for the work of his hands? To my mind, any outcry against the granting of a patent, is based upon unsound reasoning. Such an outcry can be based on nothing more than the desire of one man to appropriate to himself the result of another's brain, and wherein is this any more right or honorable than a desire for the appropriation of the work of another's hands, such as a beautiful chair, bookcase, article of silverware or other thing made by him. I, myself, can see no distinction. It is only a misappropriation, no matter by what high sounding name it may be called.

Another argument in connection with the patent system is that, even without its protection, the natural born inventor would work his brain and devise things merely for the pleasure of so doing. This is a great mistake. In the first place such people are few and far between. In the second place their inventions, while possibly unique, are generally of such a character as serve no useful purpose. Of course there are some exceptions. The rule, however, is that the actual inventor is of a more or less practical bent of mind, possibly one who is a poor business man, but at the same time one whose idea in inventing is to make money out of it. The old idea of an inventor as a crack-brained man with wheels in his head, and ambitious to invent a perpetual motion or some equally absurd contrivance has long passed away. Such men occasionally appear but, proportionally, they are about as rare as a two-headed calf or other freak of nature.

Patents in the United States were formerly granted for a term not exceeding fourteen years. By the Statute of 1870, the term was made seventeen years. In 1874 it was provided that if a patent had been previously obtained in a foreign country the United States patent would expire at the same time as the foreign patent expired, but in no case would its term be over seventeen years. Later by statute in force beginning

January 1, 1898, this limitation of term by reason of previously obtained foreign patents was removed and all patents on applications filed since that time have been granted for a term of seventeen years.

Frequently, a patent is infringed. In such case the only recourse of a patentee, if he cannot, by agreement, persuade the infringer to stop, is to sue him.

A patentee in one court decision was likened by a judge to that celebrated character in Holy Writ, Ishmael, in that his hand was against every man and every man's hand against him. While his condition is possibly not quite as serious as that of the biblical character, still it is true that his road is not at all smooth. Very few patents are at once accepted by rivals as being valid. Consequently in order to maintain his rights, if his invention is commercially valuable, it is necessary to bring suit against infringers. In defending this suit the opponents make use of all the defenses permitted by the statutes. The most common defense is that of anticipation by older patents or publications and to determine this the defendants cause to be made elaborate and extensive searches taking days, weeks and frequently months. In such search anticipating references are occasionally discovered.

Although the most frequent cause for the holding that a patent is invalid is that of anticipation by patents or by disclosure in publications, there are other reasons. A patent may be held invalid if it is proven that the invention has been in public use or on sale by any one, even the patentee, for more than two years before the application for the patent was filed, or it may be held invalid if it is proven that another party invented the subject-matter before the patentee; or if the patentee himself was not the actual inventor.

### BYPRODUCT COKE OVENS ORIGINATED IN BELGIUM.

#### The First Aniline Colors were Made at Flenau.

A Belgian engineer, writing in *Coal Age*, says: "Belgium was a pioneer in the byproduct industry. The oldest byproduct company now in existence is the Societe Anonyme du Charbonnage des Produits, at Flenau, Belgium, which was incorporated in 1856 for the mining of coal and the manufacture of byproducts. The Products company never ceased for a single day, since 1856, to make byproducts; and the first aniline colors ever put on the market were made at Flenau by this company at a time when its coke and by-product department was managed by the noted Belgian chemist Neynicks.

"With the advent of the Coppee vertical-flue coke oven, the Products company became quite a factor in the by-product industry. That was about 1870, at a time when Germany had only beehive coke ovens and when all coke made in Belgium was produced in retort ovens of the original Coppee style. Not only was Germany behind Belgium in getting rid of its beehive ovens, but even to this day there is not in Germany a single coke oven which is not of the vertical-flue kind first invented by Coppee, a Belgian, or the horizontal-flue style developed by Solvay and Semet, the former a Belgian, the latter a Frenchman, both living to-day. There are many people in this country, even among those in the byproduct industry, who believe that the byproduct oven is of German origin and development. To this day, Belgian coke ovens have always kept at least one step ahead of all others."



**TEMISKAMING.**

Mr. Douglas A. Mutch, mining engineer, Cobalt, Ont., in a report to the shareholders of the Temiskaming Mining Company, Limited, says in part:

Having been officially informed by your president and general manager on September 15th, 1917, that I was to make an examination of the Temiskaming mine and workings, work was commenced on the examination September 19th, 1917.

A preliminary examination was made with the object of becoming familiar with the underground workings, and laying out a system for the complete sampling of the various levels and stopes. Sampling was started on September 25th and completed October 31st. Particular attention was paid to the old workings, and every part of the mine was visited.

During the work practically every vein and fracture was examined and where warranted, thoroughly sampled. Between seven and eight hundred samples were taken.

It was found that practically all the ore reserves were in the form of broken ore laying on the stulls. The greater part of this broken ore being confined to stopes on Veins No. 19 and No. 21. It was found that the wall rock seldom carried commercial values. This shortened the work considerably.

Outside of the ore reserves shown as broken ore and ore in place, there are a few small pillars and ends of veins scattered throughout the mine.

Under the heading "Ore Indicated" are shown reserves which only show one face. These reserves amount to very little and the estimation is based on the sampling of ore exposed, and the conclusions arrived at, as to the ore likely to develop by a study of other similar deposits in the mine. Owing to the very erratic nature of the deposits, it is impossible to prognosticate what ore might be developed on certain veins whose present faces are barren.

An estimation of the tonnage in the tailings dump was made. This was difficult owing to there being no record of the contours of the surface underlying the tailings. A great many soundings were taken and a close approximation arrived at. This dump was sampled by the company, and the value which their sampling showed is used in estimating silver content.

Towards the close of the examination, the conclusion was reached that ore reserves were comparatively small, and that it was a question of rapidly developing new ore. At this time little or no ore was being broken or developed. This conclusion called for a study of the geological problems presented throughout the mine. With this end in view I employed A. R. Whitman, the eminent geologist, to consult with me on the work. Unfortunately this work was stopped by your management when about half completed. It is my firm belief that in order to intelligently explore the remaining portion of your property that this geological work should be completed.

**Summary of Ore Reserves.**

	Tons Ore.	Oz Silver
Positive ore . . . . .	9,503	361,241
Ore partially developed . . . . .	1,171	24,761
Ore indicated . . . . .	142	4,498
Totals . . . . .	10,816	393,800

Owing to extreme variability, even in short lengths of the deposits, also to undetermined dilution which has taken place in the first item of 8,019 tons, this summary should be qualified. I therefore estimate a

total gross ore reserve of 10,816 tons which will yield between 350,000 and 400,000 oz. Nothing that can be estimated as ore reserves at the present time has been left out of this estimation. There are several parts of the mine where development may open up new ore. The No. 15 Vein above the 400-ft. level offers chances. The eastern portions of your property above the 575-ft. level shows strong fracturing with little or no values. It is possible that work in this section might open up pay shoots. The No. 6 Vein on the North boundary may develop ore above the 500-ft. level.

Careful attention was paid to the Gans Lot. No indication of ore was found on this lot, the development work done has been fairly extensive and has decidedly lessened the possibilities.

The work on the 500-ft. level on this lot follows and cuts the most likely section of the property. There is nothing showing in the workings along the lower contact on your property to warrant further work on the 1,600-ft. level.

Tailings Dump.—A careful survey was made and numerous soundings taken on the tailings dump. This work would indicate a gross tonnage of 60,000 to 75,000 tons which could be recovered and treated at present selling price of silver, at a profit. Of this tonnage approximately 40,000 tons or 66 per cent. lies on ground not owned by your company. Surveying and soundings show a total of 1,227,737 cubic feet. In figuring tonnage 20 cubic feet were taken to equal one ton. Sampling indicates a value of 4.2 oz. per ton. This gives a valuation as follows:

	Gross Silver Content Oz.
Tons on Temiskaming Property; 20,000 tons at 4.2 oz. . . . .	84,000
Tons on Adjoining Property; 40,000 tons at 4.2 oz. . . . .	168,000
Total tons 60,000 to 75,000 Total oz. 250,000 to 300,000	

Conclusion. Total ore reserves at time of examination 10,816 tons, which will yield 350,000 to 400,000 oz. of silver. Little or no ore being developed or broken at the present time. Gans lot offers small chances for ore deposits. Exploration work on 1,600-ft. level or lower contact shows nothing to warrant further expenditure. Property is at that stage where life depends on the development of new ore. Exploration work should be governed by geological data, as ore deposits in this section are governed by geological phenomena. Geological work as started by A. R. Whitman and myself should be continued immediately to properly govern future exploration.

**DOME.**

J. R. De Lamar, New York, president of Dome Mines, has made the following statement:

"At a meeting of the directors of the Dome Mines Company held this 26th day of November, it was resolved to shut down the mill for the present and continue shaft sinking and the development of the known ore bodies, besides keeping the diamond drills at work on exploring operations. This conclusion was arrived at because while formerly six dollar ore enabled the board to declare dividends at the rate of 20 per cent. per annum on the shares and augment the surplus, this same class of ore now does not pay a profit because of increased cost of labor and supplies, inferiority of labor, and because there are only men enough to be had, to keep the mill running at one-fourth of its capacity."



### ORE RECEIPTS AT TRAIL, B.C.

During the month of October 49,955 tons of ore was received at the Consolidated Mining and Smelting Co.'s smelting works at Trail, West Kootenay, B.C. Of this quantity 33,340 tons was from mines operated by the company and 16,615 tons was of custom ores. This was the largest quantity received in any month of 1917, the nearest to it having been 43,979 tons in March. There was one monthly total in 1916—that of August of 47,614 tons—which came nearer to the total of October of this year. Without earlier records at hand to warrant a positive statement being made, the opinion may be expressed that this quantity of nearly 50,000 tons was the largest ever received at the Trail reduction works in any single month since smelting was commenced there.

The proportions of the several districts and divisions of the October total were as under:

	Tons.	Tons.
East Kootenay—		
Fort Steele Division .....	11,846	
Windermere Division .....	374	
Golden Division .....	87	
West Kootenay—		12,307
Ainsworth Division .....	1,666	
Slocan Division .....	4,659	
Slocan City Division .....	67	
Nelson Division .....	535	
Trail Creek Div. (Rossland) ..	17,662	
Arrow Lake Division .....	2	
Trout Lake Division .....	90	
Revelstoke Division .....	31	
		24,712
Boundary—Greenwood Division ..		5,225
Yale—Kamloops Division .....		506
Yukon Territory .....		48
Alberta .....		33
Manitoba (Mandy, Le Pas) .....		266
Ontario (Tip Top, Kashabowie) ..		753
United States—		
Idaho .....	374	
Montana .....	73	
Washington .....	5,658	6,105
Total .....	49,955	

The total of ore receipts for the expired ten months of 1917 is 336,615 tons, of which 236,849 tons was from mines operated by the Consolidated Co. and 99,766 tons was of custom ores. The decrease as compared with the corresponding period of 1916 was nearly 80,000 tons.

### The Chief Shippers of Ore to Trail.

The larger shippers of ore to the Trail smelting works during the month of October were, among the mines operated by the Consolidated Co., the Sullivan, in East Kootenay, 11,520 tons, chiefly of zinc ore; the Centre Star, Le Roi and White Bear mines, in Rossland camp, together 15,778 tons of gold-copper ore, and the Emma, in Greenwood division of Boundary district, 5,156 tons of copper-gold ore. The remaining 886 tons received from the company's mines was of silver-lead ores from East Kootenay, Ainsworth, Slocan and Nelson divisions.

Shipments of custom ores included 1,864 tons from the Le Roi No. 2 Company's gold-copper mine at Rossland; 1,178 tons of silver-lead (and probably zinc) ore from the Standard mine near Slocan lake; 861 tons chiefly of zinc ore, from the Lucky Jim mine, Slocan; 786 tons of lead ore from the Bluebell mine at Riondel, Kootenay lake; and numerous smaller shipments from various parts of British Columbia. Of the 7,205 tons of ore received from places outside the Province, the 5,658 tons from the State of Washington included 2,132 tons of lead ore from the Electric Point mine situated between the International Boundary line and the Northport district in which there is a smelting works in operation; 1,794 tons from the Quilp, which was one of several shippers of gold ore from Republic camp, and 583 tons of copper-gold ore from the United Copper Co.'s mine near Chewelah. The 753 tons of ore received from Ontario was all from the Tip Top mine, Kashabowie, and the 266 tons from Manitoba was from the Mandy mine, situated 65 miles north of The Pas.

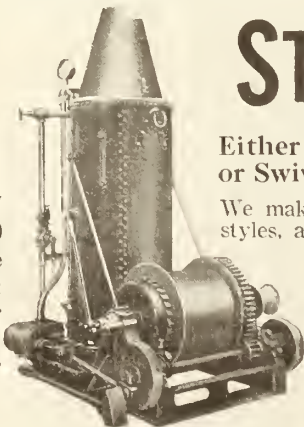
### EMBARGO ON IRON AND STEEL.

Ottawa, Nov. 16.—Exportation from Canada of iron and steel in unfinished or semi-finished forms, suitable for use in manufactures, will be prohibited by the Government, except under license from the Department of Customs. The classes of iron and steel goods upon the sale of which outside the Dominion an embargo is placed include pigs of iron, steel, ingots, billets, rods, shapes, angles and plates.

The prohibition of exportation is due to the serious shortage of iron and steel for munition making, shipbuilding and other manufactures. The United States Government has placed restrictions upon the exportation of iron and steel from that country, and has established a priority board to pass upon applications for export licenses. That board will give precedence to requests for steel for munition and other war supplies and for shipbuilding. It will then consider the

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Canadian manufacturers have conferred together with a view to laying their requirements before the United States priority board. It has been felt that at a time when Canada is applying to the United States for iron and steel, it should itself take steps to conserve the domestic output of such material for domestic uses. Export licenses will be granted by the Customs Department only for very special reasons.

### SILVER PRICES.

Boston, Nov. 25.—The silver yield from mines in the United States and Canada will come under Government domination should negotiations now under way between representatives of the United States and Great Britain on the one hand and silver producers on the other result in fixing a price for the coming year. No price has been settled upon, but so far as can be learned it will probably be between 85c and 90c an ounce.

The silver output has been falling behind during the past few years from the zenith reached in 1911, when the world produced 226,200,000 ounces. The average price in that period was 49.9c an ounce. Requirements, particularly for coinage purposes, have grown enormously during the past three years and will continue to expand for the duration of the war.

The current year's silver yield will have been affected by the shutdown for several months of copper mines in Montana and Arizona. The ores from these properties carry silver values, particularly in Montana, where the Anaconda Copper Mining Company recovers silver as a by-product in large and important quantities.

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2 miles 30-lb. at.....	60.00 per gross ton
2,500 feet 25-lb. at.....	40.00 per gross ton
2,500 feet 16-lb. at.....	40.00 per gross ton

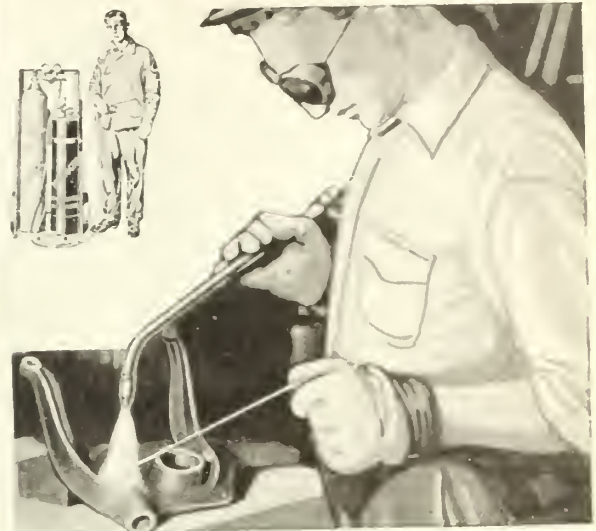
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**CANADIAN KLONDYKE.**

Dawson, Y. T., Nov. 23.—The Granville Mining Company, a bond-holding company, including Chester A. Beatty, Herbert H. Hoover, the United States Food Controller, and the South African Goldfields Co., yesterday applied in the Yukon Court, before Judge MacAulay, for a receiver for the Canadian Klondyke Power Company and the Canadian Klondyke Mining Company, alleging failure to issue bonds for a loan of \$1,350,000, or to pay interest thereon, and alleging also other reasons. The acting manager, J. W. Boyle, jun., asked that an interim receiver be named until Mr. Mayers, a Victoria lawyer, could arrive here to act as his counsel. The court agreed, appointing Harold G. Blankman, Deputy Clerk of the Yukon Court, as temporary receiver. Mr. Blankman is now on the coast en route here.

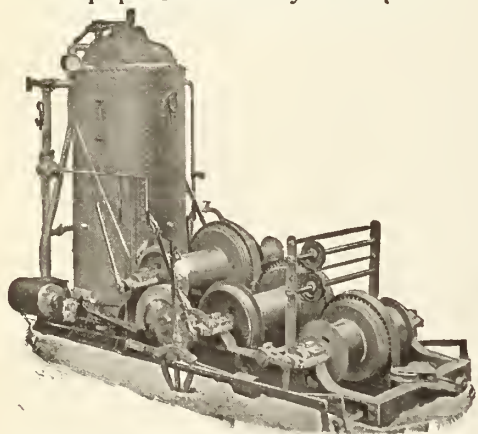
The applicants explained that it was not their intention to shut down the company's operation, but to secure an adjustment for the benefit of all concerned, and to arrange for immediate and steady payments of all obligations.

The mining properties of Arthur A. Boyle are defendants in a similar case.

Mr. W. C. Webster, who has been secretary and general manager and director of the Nichols Copper Company, No. 25 Broad Street, New York, for several years past, has resigned. Mr. Webster expects to take a rest before assuming further duties.

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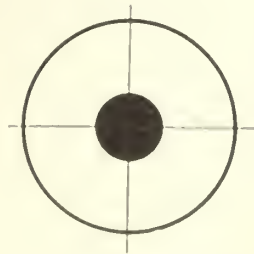
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### MINES BRANCH

#### Recent Publications

The Nickel Industry: with special reference to the Sudbury region, Ont. Report on, by Professor A. P. Coleman, Ph.D.

The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.

Building and Ornamental Stones of Canada (Western Provinces). Vol IV., by W. A. Parks, Ph.D.

Feldspar in Canada. Report on, by H. S. de Schmid, M.E.

Peat, Lignite and Coal: their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.

Annual Report of Mineral Production during Calendar Year, 1915, by John McLeish, B.A.

The Petroleum and Natural Gas Resources of Canada: Vols. I. and II., by F. G. Clapp, M.A., and others.

The Value of Peat Fuel for the Generation of Steam. Bulletin No. 17, by John Blizard, B.Sc.

Cobalt Alloys with Non-corrosive Properties. Report on, by H. T. Kalmus, B.Sc., Ph.D.

Electro-thermic Smelting of Iron Ores in Sweden. Report on, by A. Stansfield, D.Sc.

Non-metallic Minerals Used in Canadian Manufacturing Industries. Report on, by H. Frechette, M.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

**Fuel Testing Laboratory.**—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.

**Ore-Dressing Laboratory.**—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.

**Chemical Laboratory.**—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.

**Ceramic Laboratory.**—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.

**Structural Materials Laboratory.**—Experimental work on sands, cements and limes is also undertaken.

Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

### GEOLOGICAL SURVEY

#### Recent Publications

Memoir 85. Road Material Surveys in 1914, by L. Reinecke.

Memoir 87. Geology of a Portion of the Flathead Coal Area, British Columbia, by J. D. Mackenzie.

Memoir 92. Part of the District of Lake St. John, Quebec, by John A. Dresser.

Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.

Memoir 94. Ymir Mining Camp, British Columbia, by Charles Wales Drysdale.

Memoir 95. Onaping Map-Area, by W. H. Collins.

Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.

Memoir 97. Scroggie, Barker, Thistle and Kirkman Creeks, Yukon Territory, by D. D. Cairnes.

Memoir 98. Magnesite Deposits of Grenville District, Argen-teuil County, Quebec, by M. E. Wilson.

Map 57A. Frank, Alberta (showing the landslide of 1903).

Map 63A. Moncton Sheet, Westmorland and Albert Counties, New Brunswick. Topography.

Map 151A. Nansen and Victoria Creeks, Nisling River, Yukon Territory.

Map 152A. Kluane Lake, Yukon Territory.

Map 154A. Southwestern Yukon.

Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.

Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.

Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.

Map 166A. Portion of Flathead Coal Area, Kootenay District, B.C. Topography.

Map 182A. Portion of Flathead Coal Area. Geology.

Map 186A. Explored Routes between Lake Athabaska and Great Slave Lake on the Tazin, Taltson, Slave and Peace Rivers.

Map 1667. Slocan Mining Area, Kootenay District, B.C.

Map 1677. Coleraine Sheet. Megantic and Wolfe Counties, Quebec.

Applicants for publications not listed above should mention the precise area concerning which information is desired.

Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.

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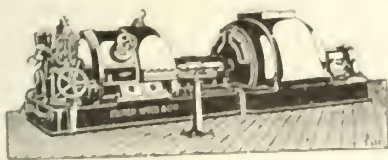
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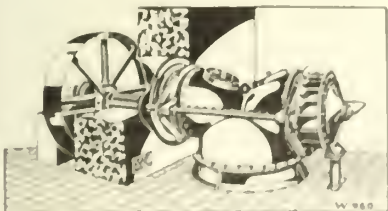
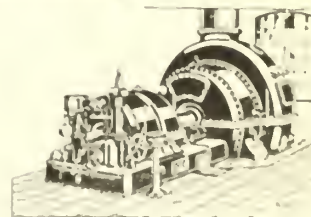
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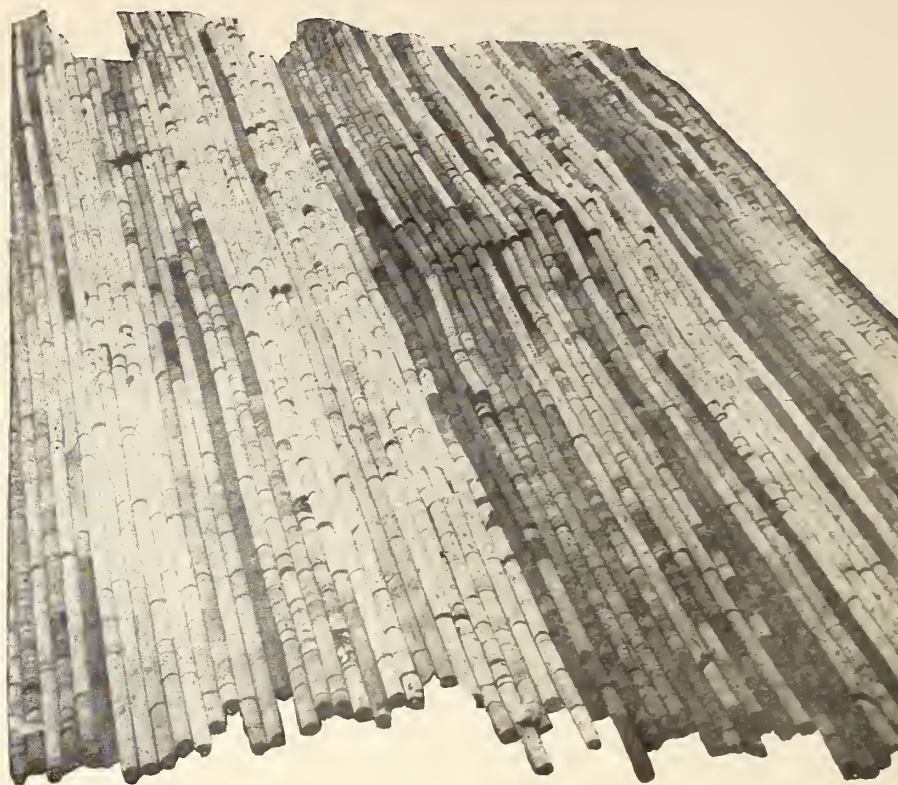
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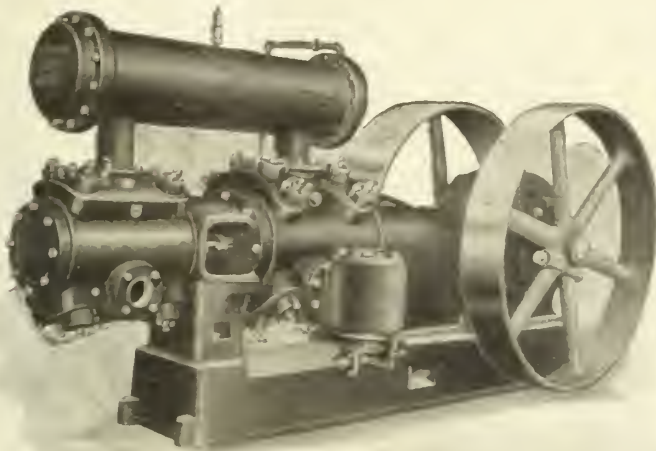
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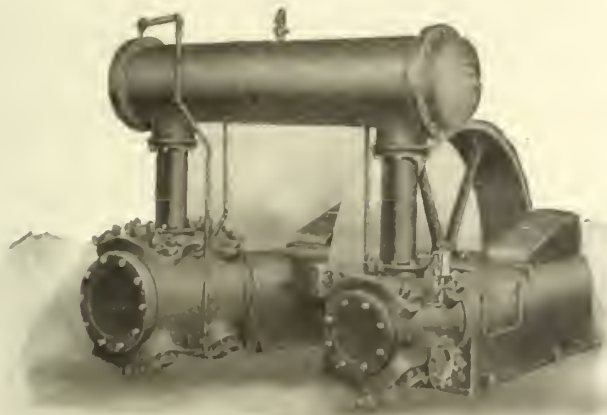


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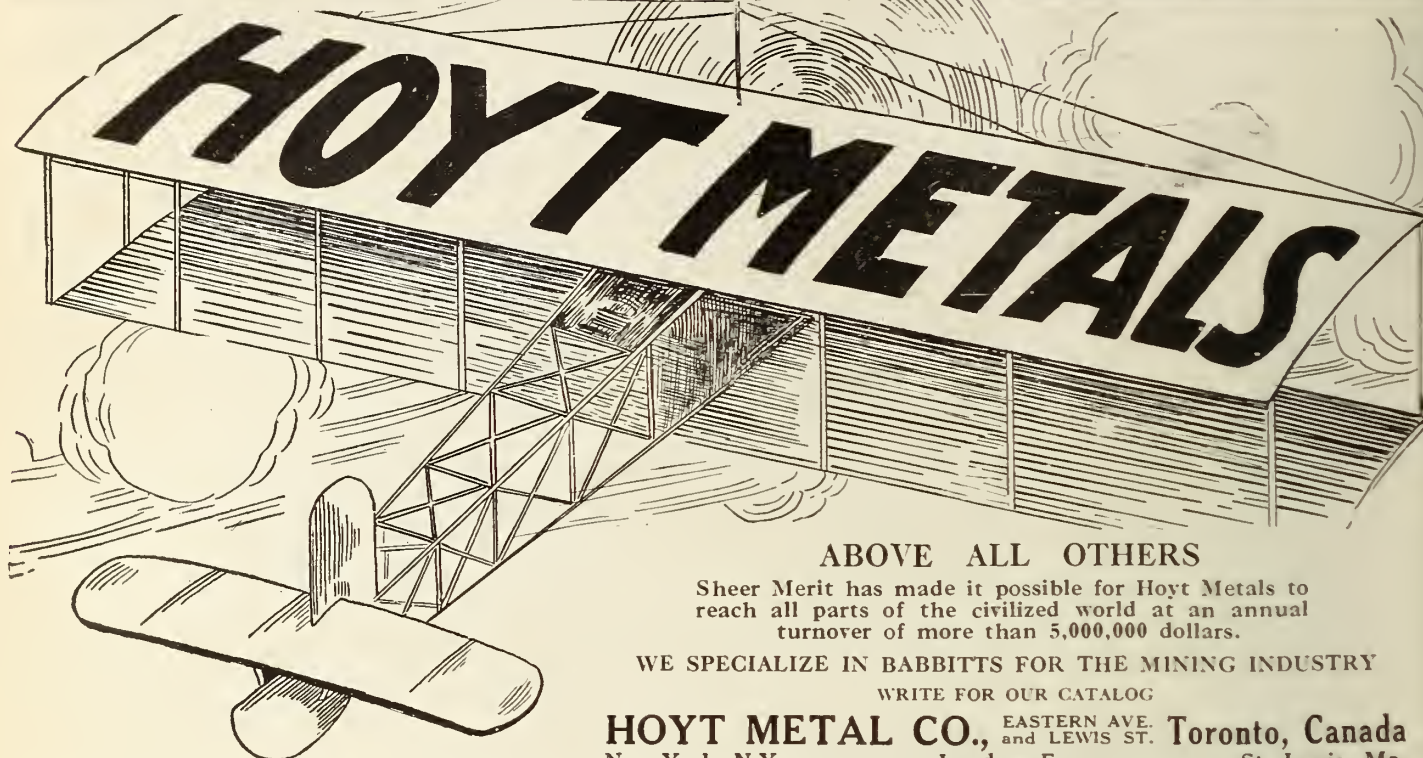
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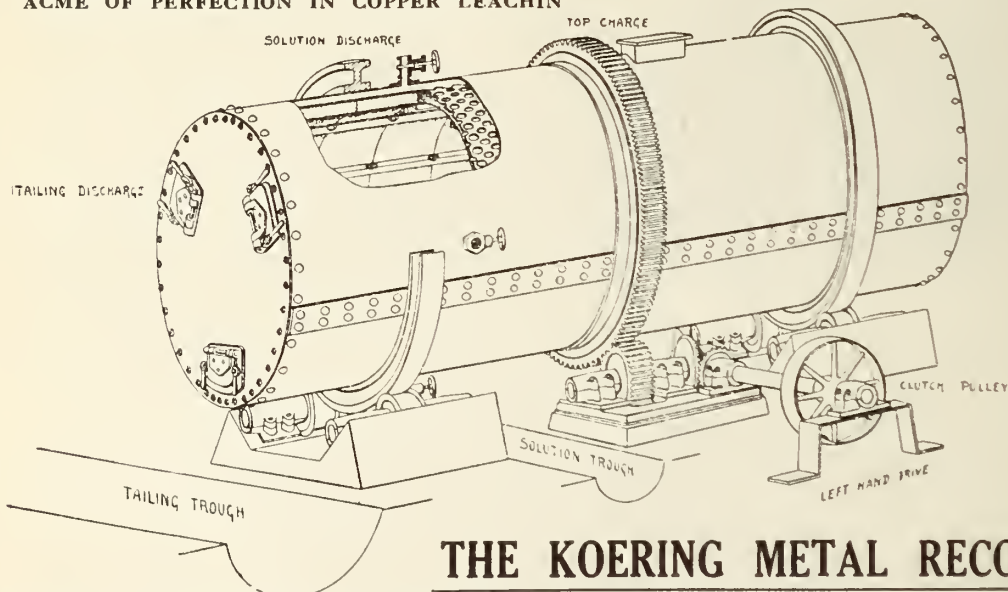
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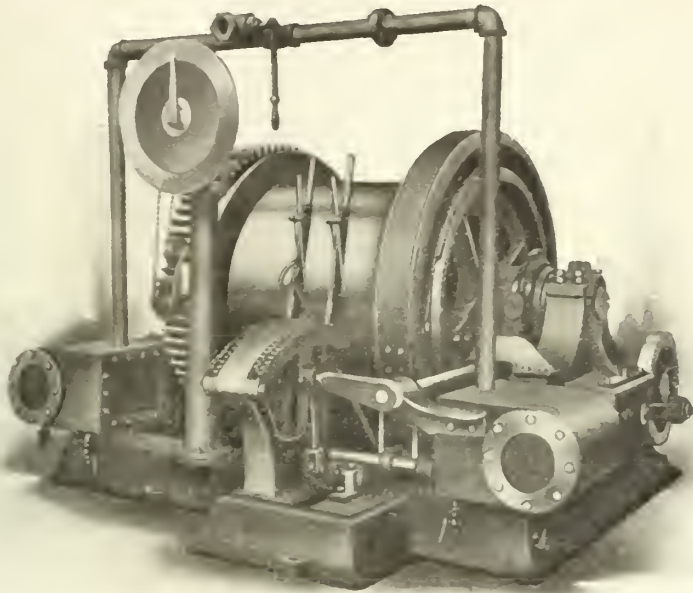
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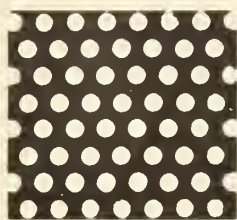
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#### Department of Colonization, Mines and Fisheries

*The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, etc.*

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**MINERS' CERTIFICATES.** First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

**WORKING CONDITIONS.** During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

**SIX MONTHS AFTER STAKING.** At the expiration of six months from date of the staking, the prospector, to retain his rights, must take out a mining license.

**MINING LICENSE.** The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

**MINING CONCESSION.** Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

**PROVINCIAL LABORATORY.** Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, MONTREAL, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

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MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC.

# The Flotation Process

All patent and other rights to this process  
in North America are now controlled by

## Minerals Separation North American Corporation

who is the registered owner of the following Canadian patents: Nos. 76,621; 87,700; 94,332; 94,516; 94,718; 96,182; 96,183; 99,743; 127,397; 129,819; 129,820; 134,271; 135,089; 137,404; 142,607; 147,431; 147,432; 148,275; 151,479; 151,480; 151,619; 151,810; 157,488; 157,603; 157,604; 160,692; 160,693; 160,694; 160,846; 160,847; 160,848; 160,849; 160,850; 160,937; 163,587; 163,608; 163,707; 163,936; 165,390; 166,415; 167,474; 167,475; 167,476; 167,603.

On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

### NOTICE

Notice is hereby given that we will enforce our patents and stop all infringements but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

Notice is further given that no one is authorized to introduce our processes or apparatus into the United States, Canada or Mexico.

All applications should be made direct to

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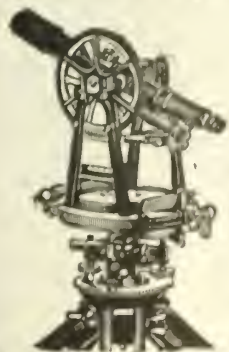
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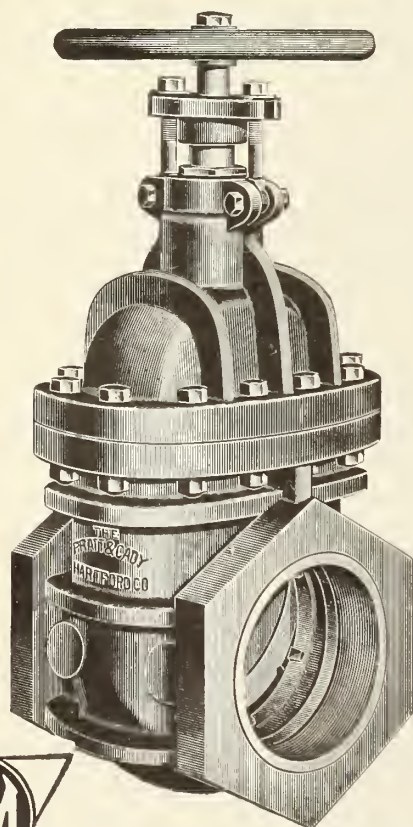
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# THE CANADIAN MINING JOURNAL

VOL. XXXVIII.

TORONTO, December 15th, 1917.

No. 24

## The Canadian Mining Journal

With which is incorporated the  
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada.

Published 1st and 15th of each month by the  
**MINES PUBLISHING CO., LIMITED**

Head Office . . . . . 263-5 Adelaide Street, West, Toronto  
Branch Office . . . . . 600 Read Bldg., Montreal

Editor: **REGINALD E. HORE, B.A. (Toronto).**

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### CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post office at Buffalo N.Y., under the Act of Congress of March 3rd, 1879."

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## THE MINERALS SEPARATION N. A. CORPORATION.

In our issue of Nov. 1, we pointed out the urgent necessity of an investigation of the Minerals Separation corporations and their connection with the American branch of the German firm, Beer, Sondheimer & Co. Fortunately, the matter has already been given serious attention by the Government as a result of the activity of the Timiskaming Mine Managers Association.

In this investigation it is well to bear in mind that Beer, Sondheimer & Co. is an alien enemy firm of very dangerous character. An investigation of any firm connected with it in any way should be very thorough. It should be carried on by competent and trustworthy officers until the whole truth is disclosed.

1917.

The year has seen great activity in mining. Shortage of labor and high cost of machinery and supplies of all kinds, has been offset by a great demand and good prices for mine products. When the final figures are available it will be shown that the value of Canada's mine products made new records in most cases, while in some there has been an increase in quantity also. In this issue will be found a number of articles reviewing the progress in various districts.

In a period of high prices, gold mining naturally suffers; but even under these circumstances we are able to record great development in this industry. Profits have fallen and payments of dividends have been suspended; but at the mines results have been obtained that assure a wonderful future.

Silver mining companies have at last received what is considered a fair price for silver, and the shortage of the supply indicates that good prices will obtain for some time. This adds materially to the profits and will greatly lengthen the life of the silver mines at Cobalt. The successful introduction of the flotation process has also done much for the silver mining companies, by providing an excellent method of recovering silver from low grade ore and old tailings.

Copper and nickel have continued in great demand. The price of nickel has been advanced slightly. The price of copper has been fixed at a figure which is generally considered fair. The mining of these two metals, so essential for munitions, has been carried on energetically. The refining of nickel in Canada in large quantities has not yet started, but the big plant of the International Nickel Co., at Port Colborne is nearing completion.

Lead and zinc production has been large during the year and a considerable quantity of refined zinc has been shipped from the new plant at Trail. Owing to over production in the United States the price of lead has fallen greatly and in British Columbia there has lately been a set back owing to difficulty in selling the metal.

The mining of molybdenite has become a much more important industry during the year; but natural development is hampered by an embargo which prevents the sale of molybdenite in the open market. It is to be hoped that this embargo will soon be removed. When it is removed a much larger production will be possible, for much higher prices can be obtained in the United States than in Canada.

The great demand for iron and steel has resulted in large increase in production at Canadian plants, but the production of iron ore continues to be only a small fraction of the amount used in Canadian furnaces.

Owing to labor shortage in coal mining districts and to strikes in western districts the production of



coal has been much less than is desirable. We have enormous supplies of coal in the East and West. It is unfortunate that we are not using them to better advantage.

Asbestos mining has been carried on with good results during the year. The demand for sulphuric acid has been reflected by great activity at the pyrites mines in Quebec and Ontario.

There has been a good demand during the year for such minerals as graphite, fluorspar, chromite, feldspar and magnesite. The great consumption of oil is encouraging operators to explore new territory.

There has been during the year a greater appreciation of the fact that our basic industries are of vital importance during the war and it seems likely that efforts to increase production will meet with more than usual encouragement in the coming year.

#### THE MISLEADING REPORT OF THE COMMITTEE ON PUBLIC PRINTING.

As our readers are well aware, the United States Geological Survey has been sending out a very large number of reports on mineral deposits during the past year. There never was a time when these reports were more useful. In view of the facts is it not surprising that the Committee on Public Printing reported to the House in part as follows:

"Economy will have to be Canada's watchword for many years to come, and the printing bills of Parliament and the Public Departments present a fertile field for action in this regard. That our great neighbors to the South realize this in connection with Congressional publications is shown by the decision of the Senate of the United States to cut down this year its printing bills by \$470,000. This has been brought about by reducing the bulk of some reports and suspending entirely the publication of others. Among the latter may be mentioned:—Monthly Summary of Foreign Commerce, Annual Report of Foreign Commerce and Navigation, Report of District of Columbia Health Office, Bulletin of the Bureau of Ethnology, annual report, ditto; Bulletins of the Bureau of Fisheries, Geological Bulletins, Geological Professional papers, Geological Water Supply papers, Memoirs of the National Academy of Sciences, Nautical Almanac, Annual report of the Bureau of Soils and many others."

It is quite true, as we have pointed out before in these columns, that there is waste in Public Printing; but it is just as true that this Committee completely distorted the facts. No such measure as the Committee referred to is in operation in the United States. A bill providing for decrease in allotment for printing did pass in the Senate; but that measure did not aim to suspend the publication of the reports mentioned; but provided only that the Congressional edition should be discontinued. That is, members of Congress were not to be given copies for distribution; but the regular distribution by departments was to be continued.

Even this proposal failed to pass the House and is not in operation. Under the circumstances the report of the Committee was very misleading and little nearer the truth than other statements of the Committee to which we referred in our last number.

In the December 1 issue of "Engineering and Mining Journal" there is an excellent article on flotation patent litigation in the United States. The author, Mr. R. C. Canby, is thoroughly conversant with the subject and writes with authority. His article should be carefully read. It is not likely that Canadians will have to study this matter so carefully as have our American friends; but they will find Mr. Canby's article very enlightening.

In Canada it seems probable that litigation between flotation patent owners and mining companies will be avoided by Government action. If it should be proved that the Minerals Separation corporations are controlled by Germans, our American friends will also be relieved of a burden. In any event we expect that Canadian mining companies will be able to avoid costly litigation and unreasonable royalties.

It is unfortunate that in order to have the matter of our mineral resources more carefully considered, we had to include Mr. Mackenzie in our criticism of the Munition Resources Commission. Mr. Mackenzie is a member and secretary of the Munition Resources Commission and he naturally resents what we have said about the folly of asking the Commission to undertake work for which it is not qualified. Mr. Mackenzie would be a valuable member of a Committee on War Minerals, but that does not mean that the Munition Resources Commission is a competent Committee on War Minerals. The members of that Commission would probably undertake anything, if Mackenzie would offer to do the work, that would help to win the war; but that does not mean that good results would be obtained.

The necessary men for a real War Minerals Committee are available and the machinery is in good working order. Mr. Mackenzie showed good spirit in undertaking this work and merits praise rather than criticism for his part in it. It is, however, an unnecessary burden and the Commission should be glad to get rid of it. As a member of a real War Minerals Committee Mr. Mackenzie could well present the views of the Commission.

There is, of course, something in what Mr. Mackenzie says about the possibility that good will result from these circulars, for the unearthing of information that would lead to the operation of even one property is worth considerable effort. We hope that some such result may be obtained; but we believe that much more might be done by a properly qualified committee which would use the machinery that exists, instead of creating new machinery for every new idea.



## CORRESPONDENCE

**DIFFERENCES BETWEEN CANADIAN AND U. S. PATENT LAWS.**

Editor Canadian Mining Journal:

Sir,—Your issue of the 1st inst. contained an interesting little article by Wm. Rich on Patents. While most of it applies equally well to Canadian patents as to United States, we desire to call attention to one point which it is very important for Canadian patentees or would-be patentees to keep in mind. While the United States allows an inventor to have his invention in public use in United States for two years prior to the date of his application, Canada only allows an inventor to have his invention in public use for one year prior to the date of his application for a patent. Further, under the United States patent act, public use by the inventor abroad has no bearing on his right to obtain a patent on his invention in United States. Under our Canadian act, public use with the knowledge or consent of the inventor anywhere in the world for more than one year prior to the date of his application for patent in Canada would prevent him obtaining a valid Canadian patent.

Yours, etc.,

Toronto, Dec. 10, 1917. RIDOUT & MAYBEE.

**THE MUNITION RESOURCES COMMISSION CIRCULAR.**

The following letter appears in the December bulletin of the Canadian Mining Institute:

To the Editor,—In its issue for November 15th, the Canadian Mining Journal expatiates at some length on the subject of the Canadian Munition Resources Commission with regard to its recent circularization of Canadian mining engineers and geologists with the view of assembling information regarding certain minerals that are or may be required during the present strenuous times.

The Canadian Mining Journal is evidently ignorant of the fact that this work was undertaken by the Commission at the request of the Secretary of the Canadian Mining Institute who had received a communication from Mr. Bradley Stoughton, of the American Institute of Mining Engineers, asking the co-operation of the Institute with the War Minerals Committee of the United States to the end that the mineral supplies of North America could be indexed effectively in order that information of a special character might immediately be available if required, having regard to the abnormal demand for certain metals and metal products. The Commission accepted this work after some correspondence with the Secretary of the C.M.I., in the course of which correspondence it was pointed out that the Commission had better facilities for conducting this investigation than the Canadian Mining Institute, and that in order to avoid duplication of effort this work in any case should properly be entrusted to the Commission. Before taking any action in the matter the subject was discussed with several members of the staff of the Department of Mines at Ottawa, and while it was fully recognized that possibly 90 per cent. of the information desired could be obtained from both Federal and Provincial publications, it was decided to proceed with the suggestion of the War Minerals Committee on the grounds that the securing of information that would lead to the operation of even one or two mineral deposits would fully justify the trouble and expense undertaken by such circularization.

The Canadian Mining Journal has apparently assumed that the Munition Resources Commission was attempting to duplicate the work of the Department of Mines and the various Provincial Bureaux with the view of making separate publications of its own findings. Such, however, is not the case. The Commission has no intention of over-lapping the work accomplished by the Federal Department or the various Provincial Bureaux, but rather intends to hand over to the Federal Department all information in its files which may possibly be made use of in future Departmental publications.

The Canadian Mining Journal makes the statement that the Department of Mines has collected information concerning all known important mineral deposits, but it fails to grasp the point that the Commission while fully aware of the truth of this statement is inquisitive as regards certain unknown and what may possibly prove to be important mineral deposits.

To what end is the Canadian Mining Journal making argument? Because the United States possess deposits of soluble phosphate are we, therefore, to ignore the possibilities of discovery in this country? Why continue any search for Canadian iron ores? There are large deposits of iron ore in Michigan and Minnesota. The nickel-copper industries of Sudbury do not manufacture sulphuric acid from their waste gases, not because there is no market for acid but because there is no market for acid that might be produced at the cost of reclaiming the waste sulphur gases at Sudbury.

It is quite within the range of possibility that some nice little tin mine may be hidden in the Canadian bush, but it will never be discovered through consultation of the present records at Ottawa or the various Provincial Bureaux.

But why argue further? The Canadian Mining Journal either cannot understand or will not take the trouble to inquire, and, therefore, one is forced to the conclusion that the War Minerals Committee of the United States and this Commission made an unfortunate mistake in attempting the inquiry as regards the mineral deposits without previous consultation with the Canadian Mining Journal.

In drawing up the circulars issued by this Commission it may be a matter of regret that the Canadian engineers and geologists were advised to supply only such information as in their opinion would not be found in the various Government publications; but at the time the circulars were issued it was considered that the men to whom they were addressed would use discrimination in this particular.

A great deal of discussion has taken place recently in the columns of the Canadian Mining Journal on the subject of a certain phosphate deposit in British Columbia and some capital has been made of the point that a report made for private interests concerning this deposit had fully covered the ground prior to the investigation of this field by public officials. Would the Canadian Mining Journal argue that this particular instance of mineral investigation for private interests without the knowledge of Government officials be an isolated case unlikely to re-occur at some future date? The whole subject of mineral investigation within the Dominion carried on by Government Departments, Commissions, and various private interests would form a most interesting subject of discussion at the forthcoming meeting of the Institute next March.

GEO. C. MACKENZIE,

Member and Secretary, Munition Resources Commission.

Ottawa, Nov. 22, 1917.



## Metal Mining in Manitoba in 1917\*

By E. L. Bruce.

During the year 1917 the province of Manitoba made its first important contribution to the Canadian metal mining industry. Two districts, both in the same belt of basic Pre-Cambrian rocks, are responsible for practically all the production. One of these, known as the Schist lake area, lies very close to the western boundary of the province, about 50 miles north of the Saskatchewan river. The other, the Herb or Wekusko lake area, is further east. The lake lies 11 miles northwest of Mile 82 north of The Pas on the Hudson's Bay railway.

At Schist lake, chalcopryite with some gold is being mined. At Herb lake, development is on gold quartz veins.

### The Mandy Mine.

The Schist lake sulphide deposit, now known as the Mandy, was discovered very late in the season of 1915 and immediately optioned by the Tonopah Mining Company, whose representative happened to be investigating other prospects in the district. During 1916 diamond drills were running continuously. By the end of the year those in charge had decided that the deposit was worth working. A contract was made with Mr. C. Morgan to haul ore from the Mandy to Sturgeon lake during the winter. The orebody was open cut and before the ice on the lakes broke up 3,500 tons was hauled to Sturgeon lake and two carloads were taken to The Pas.

Equipment for underground work was brought in on the ice and installed. This consists of a 125 h. p. boiler, a 7 drill compressor, a hoist and a portable sawmill to saw lumber for the mine buildings. A sixty-ton tug to handle barges during the summer, was hauled across from Sturgeon lake to Athapapuskow lake. Four 40-ton barges were built to transport the ore from Sturgeon lake down the Saskatchewan to The Pas, and four barges for the summer production on the Upper lakes, two on Athapapuskow and two on Schist lake. A small stern wheel steamer was also built for use on Schist lake. Low water for most of the season prevents barges coming from Schist lake to Athapapuskow, but it is hoped that by means of a lock in Schist creek this difficulty can be overcome. One gate of this lock is already in position. Ore can then be loaded directly into the barges at the mine and taken to the south side of Lake Athapapuskow only 17 miles from the head of Saskatchewan river navigation, whereas at present it must be hauled on sleighs double that distance.

During the spring and early part of the summer a vertical shaft was sunk, a station cut at 100 ft., and a crosscut driven 50 ft. to the ore. During the latter part of the summer, ore was hoisted from a stope at this level. The ore is hoisted directly to a tramway and dumped into a small ore pocket from which the barges are loaded. These are then towed 10 miles down the lake and the ore piled. It was estimated that 2,000 tons would be stocked there by the time that ice would prevent further transportation.

After the closing of the lake it is intended to sink the shaft another hundred feet so that ore can be broken on two levels. A contract for hauling 7,500 tons of ore this winter has been signed. This ore runs 19 per cent. copper with a trace of gold, making the

1917 production worth \$325,000 to \$350,000, depending on the price of copper.

### Transportation Difficulties.

Under present transportation conditions only exceptionally high grade mineral can be handled at all. The ore can be brought to Sturgeon lake only during the winter, and from there to the railroad only during a short summer. Moreover, navigation on the Saskatchewan is not always certain on account of low water in Cumberland lake.

During 1914 and 1915 a government dredge worked on the bar, forming at the outlet of the lake, and excavated a channel for shallow draft boats. For the last two years, however, nothing has been done and during the last part of the past season boats, even though specially built to draw only 2½ feet of water, could not get out into the lake. As a result 200 tons of ore mined in 1917 still lies at Sturgeon lake. Summer transportation except by water is almost impossible.

The Provincial Government last winter undertook to make a road 17 miles in length from Sturgeon lake to Athapapuskow lake, but owing to lack of an adequate appropriation and lack of labor, work was slow and the road was not ready for use until navigation was practically closed. Thus all supplies brought in during the summer had to come from the head of river navigation by slow and costly canoe transportation.

It would seem that larger grants for roads in this section should be made by the province, for even though the public lands are under Federal control the development of an active mining industry would be a direct benefit to the business men of the province.

During the past year ore after reaching The Pas had to be hauled some distance by wagons, as there is as yet no spur from the railway to the waterfront. Under such handicaps it speaks well for the management of the Mandy mine that so considerable an amount of ore has been sent out in the short time since the discovery of the orebody. The difficulties of transportation prevent the mining of the lower grade chalcopryite and the considerable amount of zinc-blende that occurs with the high grade chalcopryite.

### Flinflon.

During the summer diamond drills were working at Flinflon, four miles northwest of Schist lake, on the original discovery of sulphide ore in this district. This orebody is larger than that at Schist lake, but is lower grade and the minerals are not segregated as they are in the smaller body. Hence, under present conditions, production from this deposit cannot be expected. Some other smaller prospects are under development, but none of these are yet important.

### Herb Lake.

At Herb lake\*, activity is as yet largely confined to development work on gold-bearing quartz veins. At the Rex a shaft is down 120 ft. and a mill is being installed. There are also shafts on the Kiski claim and on the claims of the Northern Mining & Development Company. Shafts are being sunk on the McCafferty vein and on the Elizabeth. From the quartz taken out of the shaft of the Northern Manitoba Mining & Development Company a shipment of 57,000 pounds worth \$2,323 was made. This is the only actual production from the district during the year. A road has been built from Mile 82, Hudson's Bay railway, to the south end of Herb lake, a distance of eleven miles.

\*Published by permission of the Director of the Geological Survey.



The problem of transportation is only one of the difficulties that must be overcome in this new area. There is a great lack of experienced men both for actual mining work and for prospecting. Much of the country is as yet inadequately represented on any maps and as a result the few real prospectors have had to do a great deal of exploration work themselves. The one line method of staking and the holding of undeveloped ground done to the extension of the period for the completion of assessment work have also been serious drawbacks to the opening up of the country. That so large an amount of ore has been brought out in spite of all these difficulties is an indication of what may be expected when conditions become more favorable.

#### Copper and Gold Production of the New Fields in Manitoba.

The following is an approximate summary of the production during 1917:

Copper—Shipped to Trail smelter, 3,500 tons 19% Cu.; value, calculated at 25 cents per pound, \$332,500; ore stocked, 2,000 tons.

Gold—Shipped, 28½ tons; value per ton, \$81.23; total value, \$2,323.

#### TO CONTROL DEALING IN METALS.

London, Dec. 12.—The Non-Ferrous Metal Bill, which gives the Government control of all dealings in metals not containing iron and is intended to destroy what hitherto had been a virtual German monopoly in these metals, was passed on the second reading by the House of Commons last night. The bill has been criticized strongly inside and outside of Parliament.

In the course of the debate, Andrew Bonar Law, Chancellor of the Exchequer, said he wished to let Germany know that Great Britain realized her power commercially and that when the time came she should use it.

Germany should also remember, he said, that the longer the war lasted the less raw material there would be to go round, and the allies would help themselves first.

#### DIVIDENDS PAID BY COBALT SILVER MINING COMPANIES.

Commenting on the Remarkable Record of Cobalt Dividends, Mark Harris says:

The record of Cobalt dividends for the year to date is conclusive evidence of the remarkable prosperity which is being enjoyed by the producing mines of the camp. Dividends already declared for 1917 amount to \$5,454,646, as compared with \$4,967,079 in 1916, and \$4,350,526 in 1915. This is an increase of \$487,567 or close to 10%, over last year and of \$1,104,120, or nearly 30%, as compared with two years ago.

	1917.	1916.
Alladin .....	\$ 50,000	\$ .....
Beaver .....	.....	60,000
Coniagas .....	300,000	600,000
Crown Reserve .....	88,441	.....
Kerr Lake .....	690,000	600,000
La Rose .....	299,725	299,725
McKinley .....	269,723	269,723
Mining Corp. ....	1,556	570,615
Nipissing .....	1,800,000	1,500,000
Peterson Lake .....	42,032	168,128
Right of Way .....	8,428	25,283
Sen. Superior .....	.....	598,605
Temiskaming .....	300,000	225,000
Trethewey .....	50,000	50,000

#### IRON AND STEEL IN CANADA, 1917.

##### January to September.

The Mines Branch of the Department of Mines, Ottawa, has received from the producers complete returns of the production of pig iron in Canada and with the exception of two small plants complete returns of the production of steel ingots and direct steel castings during the first nine months of 1917.

The total production of pig iron during the first nine months was 895,307 short tons, as against 844,717 tons during the first nine months of 1916. The average monthly production in 1917 was 99,478 tons, as against an average monthly production throughout 1916 of 97,438 tons.

Furnaces were in blast at Sydney and North Sydney, Nova Scotia, Hamilton, Port Colborne, Sault Ste. Marie, and Deseronto, Ontario. Small quantities of pig iron were also produced in electric furnaces from scrap steel at Orillia, Collingwood, St. Catharines, Toronto, Ontario, and at Montreal, Quebec. The total quantity of pig iron thus produced in electric furnaces during the nine months was 9,983 short tons.

The total production of steel ingots and direct castings during the first nine months was 1,265,183 short tons, as against 911,054 tons during the first nine months of 1916. The average monthly production during the first nine months of 1917 was 140,576 tons as against an average monthly production throughout 1916 of 106,268 tons.

The production of steel in electric furnaces included above was 30,960 tons during the first nine months of 1917 as against a total of 19,639 tons produced throughout 1916. The production of steel in electric furnaces in September was over 5,000 tons or at the rate of over 60,000 tons per annum.

The monthly production—exports and imports during 1916 and 1917, are shown in the accompanying

tables.	Production.		Exports.		Imports.	
	1916.	1917.	1916.	1917.	1916.	1917.
January ...	562,097	89,187	1,635	106	4,450	5,473
February ...	monthly	83,801	1,393	732	4,101	3,602
March ...	average	103,789	2,725	1,394	5,603	7,442
April ...	of	101,544	30	829	5,963	5,914
May ...	93,683	108,799	30	964	8,489	7,189
June ...	99,858	131	1,483	3,190	9,330	7,411
July ...	92,012	97,047	394	1,323	8,773	5,624
August ...	87,844	110,624	3,902	1,085	3,961	1,946
September ...	102,744	100,638	1,534	1,998	5,001	.....
October ...	113,608	.....	4,344	.....	5,933	.....
November ...	104,436	.....	4,056	.....	3,310	.....
December ...	108,496	.....	2,991	.....	8,351	.....
Total ..	1,169,257	.....	28,304	.....	58,130	.....
Monthly	97,438	99,478	1,942	1,135	4,919	5,982
Average ..	.....	.....	.....	.....	.....	.....

#### Steel in Canada.

	Production of Steel Ingots and Direct Steel Castings.		Exports.*		Imports.*	
	1916.	1917.	1916.	1917.	1916.	1917.
January ...	589,553	130,990	.....	.....	4,212	13,323
February ...	monthly	120,629	.....	.....	7,288	18,213
March ...	average	152,420	.....	.....	5,206	32,596
April ...	of	139,669	.....	4,372	10,877	19,791
May ...	98,259	155,746	.....	4,811	8,542	24,928
June ...	137,695	.....	.....	5,788	11,388	31,700
July ...	100,917	137,831	.....	7,203	10,743	6,761
August ...	107,273	144,243	.....	5,405	13,415	4,784
September ...	113,411	147,260	.....	4,736	10,483	.....
October ...	123,469	.....	.....	.....	12,988	.....
November ...	124,431	.....	.....	.....	12,733	.....
December ...	116,265	.....	.....	.....	10,309	.....
Total	1,275,219	.....	.....	.....	118,979	.....
Monthly	106,348	140,576	.....	5,386	9,839	14,772
Average ..	.....	.....	.....	.....	.....	.....

\*Exports of ingots, or billets, not separately recorded previous to April 1917.

\*The figures given hereunder represent the exports of steel ingots and billets from the United States to Canada and the Navigation of the United States, Washington, D.C. The total exports to Canada during the eight months ended August 31, 1917, were 150,916 short tons valued at \$10,470,739.



## Ontario's Gold Mining Industry Expanding

During the year 1917 wonderful expansion has taken place in the gold area of Porcupine and of Kirkland Lake. The production of gold throughout the year has averaged about three-quarters of a million dollars per month, despite the serious shortage of efficient labor. In addition to maintaining this large production, a number of companies have installed or begun to install new mills, and others have been adding to their former equipment.

### Milling Capacity Increased.

Notable among the new installations is the Hollinger Consolidated, where a unit with a capacity for treating an additional 1,000 tons per day has been installed. The McIntyre-Porcupine has increased its capacity to nearly 600 tons daily as compared with about 400 tons one year ago. The Schumacher has added to its equipment and is now treating about 180 tons per day as compared with 120 tons at the beginning of the year. In the Kirkland Lake field the Teck-Hughes commenced production several months ago with an 80-ton mill and is now making arrangements for doubling its capacity. The Lake Shore is being equipped with an 80-ton mill and early in the new year will be producing gold. The foundations and preliminary work for the installation of a 150-ton mill at the Kirkland Lake Gold Mines, Limited, is under way and by the spring of 1918 should be in an advanced stage of completion. The Croesus mine in Munro township has been equipped with a 50-ton mill which is now in full operation. The Miller Independence at Boston Creek has installed a 35-ton mill and, applying successfully the oil flotation process in the recovery of gold from its ore. Several other properties have been developed to a point where milling equipment would appear to be soon warranted.

### Much Development Work Done.

In addition to producing gold amounting to about \$9,000,000 during the year, and carrying out the huge construction programme, the gold mining companies of Northern Ontario have conducted development work at a rate unprecedented in the history of mining in Canada. Thousands of men are employed, and thousands of feet of underground work consisting of drifting, crosscutting, sinking, stoping, etc., is being carried on monthly. Indeed at the Hollinger alone upwards of one mile per month of such work has been carried on. Developments have been carried to nearly one-quarter of a mile in depth at the Hollinger, the McIntyre Porcupine, the Porcupine Crown, and even now it is understood preparations are being made for the development of the Dome Mines to a depth of about 1,500 feet. Among other properties with shafts to a depth of 500 feet or more are the Schumacher, the Porcupine V. N. T., the Kirkland Lake Gold Mine, Teck-Hughes, and Tough-Oakes.

### Ore Reserves Increased.

Ore reserves in the aggregate during the past twelve months have probably increased about twenty-five per cent. over that of the beginning of the current year. Porcupine and Kirkland Lake may be roughly estimated to have perhaps \$80,000,000 in ore reserves. In fact it would not be surprising were the whole to total an even larger aggregate. In the Porcupine camp, perhaps the most important developments for the year have taken place at the Hollinger and at the McIntyre. At the former, the development of the

rich vein No. 58 disclosed a long ore shoot containing average values of upwards of \$50 per ton over a width of about twelve feet. Only one month ago on the Miller Middleton side of the property an orebody measuring approximately 71 ft. in width and containing almost one and one-half oz. of gold per ton was opened up. This orebody on surface is understood to have contained values of between only \$4 and \$5 per ton. However, at the present depth of 400 ft. the deposit appears to constitute the highest grade gold orebody ever encountered in the world. At the McIntyre, the developments at the 1,000-ft. level have also been little short of sensational. Here a huge ore deposit measuring in places as much as 58 ft. in width has been opened up for something like one-quarter of a mile in length. The average grade of the ore at this depth on the McIntyre is upwards of \$15 per ton. The downward continuation of this main orebody has been cut at a depth of 1,380 ft., where a width of about 18 ft. of ore has been indicated to contain average values of well over \$20 per ton. The mine now occupies second place in point of production among all the gold mines of the Dominion.

Due to carrying on the enormous amount of construction and development work together with the high cost of labor and supplies, the Porcupine mines have discontinued the payment of dividends, that is, with the exception of McIntyre. The latter company has been able to carry out its development and expansion program and at the same time has disbursed interim dividends at the rate of 20 per cent. per annum.

The total production to date from the gold mines of Porcupine approximates 1,830,000 oz. or about 76 tons of gold bullion. The value of the output is estimated at upwards of \$37,000,000. Dividends amounting to more than \$11,000,000 have been paid. Taken together with the \$72,900,000 in dividends paid by the Cobalt mines the aggregate dividend disbursements have now reached approximately \$84,000,000. The total production from the gold and silver mines of Northern Ontario has reached the enormous sum of more than \$190,000,000.

Silver mining commenced in 1904, but it was not until 1910 that gold mining was gotten under way. As yet there appears to have been no boundaries established to the gold area, and at the producing mines values at depth have been found excellent. With these facts in mind, it is strongly indicated that this country is probably in line for one of the most marked periods of expansion ever experienced in the history of gold mining. With the cessation of war, and with a full realization of the result of operations of the past year or so in the gold camps there would appear to be excellent reasons for looking for a veritable shower of capital for the development of the numerous promising properties in the vicinity of the already proven mines.

The management and staff of the various producing mines throughout the district have exhibited a high degree of efficiency during the period of strain of the past two years and especially the past twelve months. Indeed the industry may now be said to be in the most competent hands it ever was. The first-class mining engineers have won the confidence of the directors and the shareholders alike of the companies which they represent.

The gold camps of Northern Ontario in their order of importance, are: Porcupine, Kirkland Lake, Munro, Boston Creek, Bourk's Siding, Larder Lake, and Kow-



kash. Among the promising prospective fields are: Lightning River, Sesekinika, Skead Township, Fort Matachewan, Thackeray, etc.

Thus, with scores of millions of dollars in ore reserves in the producing mines of the leading camps, and with scores of excellent prospects in the various promising newer fields, and with no boundaries to the auriferous zone having yet been established, the assertions of the leading mining men of the country who say "with the cessation of war the country will go mad with excitement over the demonstrated mineral wealth of Northern Ontario," would appear to be well founded.

### ANOTHER PYRITES MINE.

The great consumption of sulphuric acid has created an excellent market for pyrites. In New York the wholesale price is now about 20 cents per unit for domestic ore. The pyrites mines in Quebec and Ontario are not large in number but the total output has been considerable. A very large production is being made by the Madoc Mining Co., at Gondreau.

During the past summer a number of men have been employed in developing the pyrites property of the Rand Consolidated Mines Ltd., near Goudreau. Several shipments have recently been made from this new mine. The accompanying photographs illustrate conditions at the property.

Mr. A. W. Jackson says of the operations being carried on:

"Our principal energies are devoted to the getting out and shipping of a body of natural fines which we have uncovered. This ore is now being shipped as rapidly as railroad cars are being delivered to us. The exact extent of these fines is impossible to determine at the present time. Our present pit is about 40 by 100 ft. The fines here were covered with from five to six feet of limonite. The fines vary in depth from 3 feet to 8 and 9 feet and may possibly continue below this depth as we find the hard ore in a number of places is underlain by still further fines. The fines extend beyond this open pit in all directions.

"Back of the fines on higher ground we are open cutting in the solid ore. We have considerable of this ore broken down ready to run through crushers. The crusher foundations have been completed, and it will only be a very short time before the crushers are operating. We have at this property one No. 7½ Tel-Smith Gyratory and two No. 5 Tel-Smith Gyratory crushers. We are extending our private switch to



double its present capacity. Larger quarters are being erected for the accommodation of additional men so the force can be increased. Included in the general equipment we have a steam shovel, and a steam grader for stripping. The work is going on under the supervision of Mr. H. L. Botsford, mining engineer. Considerable additional equipment such as a dinky locomotive, heavier rails, etc., will probably be installed before spring."

### NEW OFFICES, CANADIAN MINING INSTITUTE.

The Canadian Mining Institute has removed its offices in Montreal from the Ritz Carlton Hotel to the Drummond Bldg., 511 St. Catherine St. W.

### ONTARIO-KIRKLAND GOLD MINES, LTD.

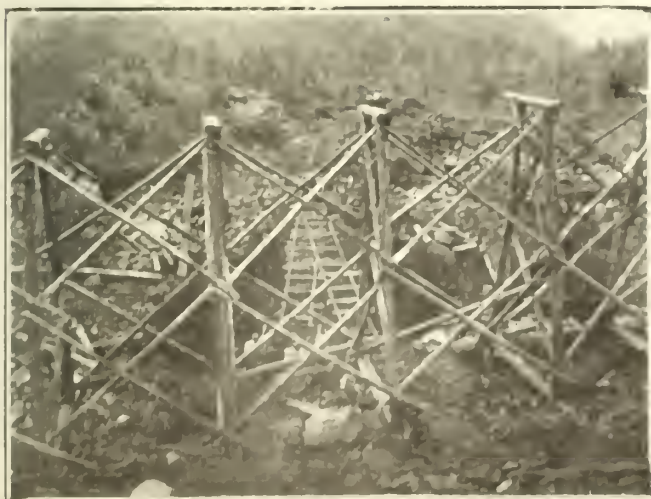
This company is about to begin operations at its property, the Hurd claims, at Kirkland Lake. Mr. Thos. J. Flynn is in charge of the work. Mr. B. G. Cobb, of New York, has been retained in an advisory capacity.

President Harry A. Cochrane says: "Our property comprises two full claims (formerly the Hurd), and our buildings are all up and furnished. The shaft is down 100 feet, and we are now into good millable ore. A 150-ft. section on our No. 1 vein, channelled every ten feet (15 samples), gives us an average assay value of \$9.55 per ton, and our other mineralized zones, after being systematically stripped, channeled and assayed for a fairly good distance, also show very satisfactory values."

### TEMISKAMING.

In reference to the proposal to purchase an interest in the Kirkland Lake Co., Mr. Max Morgenstern has issued a circular letter which shows that he disapproves. He says in part: "The latest proposition has been communicated to you; I would consider it a new edition of a joke, if it did not possibly mean serious consequences to our Company."

"The large owners of shares in our Company are to day, if anything even more strongly opposed to the present form of the deal, although the offer is 10 cents per share cheaper for a larger block of stock than the shareholders were offered last February. The reason for this fact is to be found in various extraordinary developments which have taken place since."





## NICKEL\*

By E. P. Mathewson.

In the middle ages the German miners were perhaps the most famous in the world. The mining of copper ore was one of their specialties. The miners were a superstitious people, believing in fairies, goblins and all manner of spirits. Two peculiar varieties of these were supposed to inhabit the mines, these were known as Kobalds and Nickels. The Kobalds were considered rather a lazy lot, but the Nickels were infamous thieves and were supposed to rob the ore of its copper. This was on account of the remarkable properties of certain ores that closely resembled copper ore, which on being treated in the copper furnaces, instead of yielding metallic copper, turned into a grey ash, from which no copper could be extracted, so the miners believed the Nickels had stolen the copper from this ore and they therefore named it kupfer nickel.

The Nickels got their name from St. Nicholas, the thieves' Patron Saint, and their actions in the mines and smelters were worthy of "Old Nick" himself. Many modern metallurgists who have encountered nickel in ores supposedly free from that element can readily sympathize with their predecessors in the art, on account of the difficulty of treating the ore in the ordinary manner.

In 1751 a Swedish chemist named Cronstadt discovered both nickel and cobalt to be metallic elements, and he named them after the "Spirits of the Mines." These two metals are closely allied to one another and to the metals iron and manganese. Nickel is a white metal almost as white as silver. It is hard and takes a fine polish, it is malleable and ductile.

Chemists have estimated that nickel is about twice as plentiful as copper in the earth's crust, but it is not found in concentrated form in many localities. A very high temperature is required to melt it, practically the same as iron.

In nature it is usually found combined with iron and sulphur, and frequently with iron, sulphur, copper and arsenic. It is an important constituent of meteorites.

In the mining of nickel ores, Norway held the palm until 1877, then New Caledonia took the lead and held it until 1890, then Canada stepped to the front and gained the premier position, which it has held ever since.

### Canada's Leading Position as a Producer of Nickel.

Up to the time that Canada became the most important producer of nickel, the world's output of refined nickel was comparatively small. It was estimated at a little over 500 tons in 1876, of which Norway was credited with 360 tons.

The world's output for 1916 is estimated at 49,000 tons nickel, of which

Canada produced . . . .	85.8%	or 42,000 tons
New Caledonia . . . .	9.2%	or 4,500 tons
Norway . . . . .	2.0%	or 1,000 tons
U. S. A. (by-products) . . . .	2.0%	or 1,000 tons
All other countries . . . .	1.0%	or 500 tons

100.0% or 49,000 tons

At the outbreak of the war, Great Britain and France controlled 95 per cent. of the nickel produced in the world and by placing embargo on shipments to Germany, 2 per cent. additional, Norway being

still an important shipper to Germany. On account of the necessities of our enemies, the prices offered for nickel were so great that the Norwegian producers were doing everything in their power to increase their output and had arranged to double it, when Great Britain stepped in and, by certain negotiations with the producing companies, practically stopped shipments to Germany.

### Report of Ontario Nickel Commission.

There was, as we all know, considerable agitation in Canada for the construction of nickel refinery plants in Ontario, which was augmented by the incident of the shipment of nickel from the United States to Germany in the submarine "Deutschland." On Sept. 9th, 1915, a Royal Commission of four experts was appointed to investigate the resources, industries and capacities of Ontario in connection with nickel and its ores. This Commission made a most searching inquiry into this matter and recently published a voluminous report on the subject, which is obtainable by application to Thomas W. Gibson, Secretary Royal Ontario Nickel Commission, Toronto, Ont.

The Commission arrived at the following conclusions:

"1. The nickel ore deposits of Ontario are much more extensive and offer better facilities for the production of nickel at a low cost than do those of any other country. Nickel-bearing ores occur in many parts of the world, but the great extent of the deposits in this Province, their richness and uniformity in metal contents, and the success of the industry points strongly to the conclusion that Ontario nickel has little to fear from competition.

"2. Any of the processes now in use for refining nickel could be successfully used in Ontario, and conditions and facilities are at least as good in this Province as in any other part of Canada.

"3. In view of the fact that practically no chemicals are required, that there is a much more complete saving of the precious metals, especially platinum and palladium, and that electric power is cheap and abundant, the most satisfactory method of refining in Ontario will be the electrolytic.

"4. The refining of nickel in Ontario will not only benefit the nickel industry, but will promote the welfare of existing branches of the chemical and metallurgical industries, and lead to the introduction of others.

"5. The methods employed at the Ontario plants of the two operating nickel companies are modern and efficient, although there are differences in both mining and smelting practice. It is the consistent policy of both companies to adopt all modern improvements in plant or treatment. Even during the present time of acute pressure, the Canadian Copper Co. has materially increased its output without substantial enlargement of its plant, and the losses in smelting are less, both at Copper Cliff and the Mond plant at Coniston, than they were a year ago. These companies have each had their experimental stage, neither has asked nor received any government assistance, and they have earned the success which they have achieved.

"6. The present system of mining taxation is just and equitable and in the public interest, and is the best system for this Province. Any question of change is rather one of rate than of principle.

"7. Experiments have been undertaken by the Commission in the production of nickel-copper-steel direct from Sudbury ores, and also in the electrolytic refining of nickel. Certain improvements in the latter

\*An address before the Royal Canadian Institute, Toronto, Nov. 28, 1917.

process have been made the subject of application on behalf of the Government of Ontario for patents in Canada, United States and Great Britain."

The Commission further states that, "the proven or positive ore of the Sudbury area can be conservatively put at 70 million tons, while it is safe to say that the proven, together with the probable and possible ore supply, exceeds 150 million tons. The International Nickel Co.'s published estimate of their ore reserves is 57 million tons, which is for three mines only. Although the Sudbury deposits have been worked for 29 years, there is vastly more ore proven in the district today than there was five years ago.

"No such vast deposits of workable ores, considered as a source of metallic nickel, are known in any other country, and there is no reason to believe that any competition will arise with which Ontario cannot cope."

### Extraction of Nickel From Its Ores.

In extracting nickel from its ores, there are four important steps: (1) **Roasting** to drive off excess sulphur. This is done either in heaps, using cordwood for fuel, or in furnaces mechanically operated and fired by coal. (2) **Smelting** in blast or reverberatory furnaces, to form low grade matte, a mixture of nickel, copper, iron and sulphur, containing also the precious metals if such are present in the ore, and slag, which is a mixture of the earthy matter in the ore and is here discarded. (3) **Converting** or concentrating the matte by driving off more sulphur and removing the iron in the form of slag. This is performed in large cylindrical furnaces lined with magnesite brick and provided with a large number of small pipes or tuyeres penetrating the brick lining, through which air under pressure is forced, causing chemical action in the hot matte contained in the vessel, thus producing sufficient heat to keep the mass molten. The iron and sulphur are oxidized, and the iron combines with silicious material to form slag, which is poured out of the converter from time to time. The sulphur escapes up the chimney in the form of gas. (4) **Refining** in which the concentrated matte (containing approximately 80 per cent. copper and nickel) is purified by removal of the remaining sulphur and the separation of the nickel from the copper and precious metals.

Up to this point the processes in different establishments are practically identical, the one important exception being that in some plants the roasting operation is combined with the smelting and is performed in the blast furnace. There are three standard methods of refining such nickel ores as we find in Canada: (1) The Orford process; (2) the Mond process, and (3) the electrolytic or Hybinette process.

In the Orford process the copper-nickel matte is smelted with sodium sulphate and carbonaceous matter, producing a double sulphide of copper and sodium which separates as an upper layer above a matte much richer in nickel and poorer in copper. A repetition of this process eliminates the bulk of the copper and a matte is finally obtained that is so rich in nickel that, after being roasted and leached, it can be smelted in a reverberatory furnace for the production of metallic nickel.

The disadvantage of the Orford process is that there is but a small recovery of the precious metals and it is believed that the loss of copper and nickel is greater than in the other two processes.

In the Mond process the ores are roasted to remove the sulphur, and leached with sulphuric acid to remove the copper as copper sulphate, followed by the reduction of nickel oxide together with a small quantity of copper oxide by means of producer gas to a finely divided metallic state. Next the metal is treated in a vertical chamber at a certain temperature with producer gas, which converts the nickel into the volatile nickel carbonyl, which in turn is decomposed to metallic nickel in another tower at a still higher temperature.

The Hybinette process at present used at the Norwegian refinery referred to above is the one adopted by the British America Nickel Corporation near Sudbury. In this the granulated matte is roasted, then leached with sulphuric acid to extract the bulk of the copper, which is precipitated electrolytically in special tanks. The matte residue is melted into plates and put through a special electrolytic process whereby the nickel is separated in purified form. The precious metals are recovered from the electrolytic slime which is deposited in the bottom of the tanks.

### Uses of Nickel.

The greatest use of nickel is in an alloy of steel. Bradley Stoughton in "The Metallurgy of Iron and Steel" says: "In the ordinary commercial alloys the nickel ranges from 1.50 to 4.50 per cent. and usually from 2.00 to 3.75 per cent., while the carbon varies from 0.20 to 0.50 per cent. If we omit armour plate, which, besides nickel, contains chromium, the most important uses of nickel steel are for structural work in bridges, railroad rails, especially on curves, steel castings, ordnance, engine forgings, shafting, especially marine shafting, frame and engine parts for automobiles, wire cables, axles, especially automobiles, railway cars, etc."

The reason for these specific uses of nickel steel are the wonderful properties conferred by the addition of such small amounts of nickel.

In bridge construction the use of nickel steel saves from 10 to 30 per cent. in weight, and up to 12 per cent. in cost. The Quebec bridge is an example of the use of this alloy.

Nickel steel and white metals (i.e. non-ferrous alloys containing nickel) probably now during war times use up 90 per cent. of the total world production of this metal.

Nickel is not easily corroded—salt or fresh water do not affect it, and on this account the metal is useful for cooking utensils.

Monel metal is an alloy of nickel and copper made by the International Nickel Co. by smelting ores from the Sudbury district without separating the copper from the nickel. The composition is approximately 67 per cent. nickel, 28 per cent. copper, and 5 per cent. iron and cobalt. It has a tensile strength equal to good nickel steel, is not easily corroded, is of the same color and takes a polish equal to that of nickel. It is used for propellers for warships and smaller craft, moulding racing motor boats, for valves on high pressure steam lines, valve stems, pump rods and liners, acid pumps, burning points in enamelling and japanning ovens, pickle frames and rods in tin plate mills, wire cloth, golf club heads and roofing materials.

There are many alloys of copper with zinc and nickel in varying proportions, which are known as German silver (average composition about 50 to 60 per cent. copper, 20 to 30 per cent. zinc, and 15 to 25 per cent. nickel).



Niehrome is an alloy of nickel and chromium used largely for resistance wires in electrical work. It stands temperatures above red heat without melting and with little oxidation. Considerable quantities of nickel are used for plating iron and other metals where a beautiful protective finish is desired.

Nickel alloyed with copper is used for coinage.

From what has been said, the importance of the nickel industry to Canada cannot be overestimated. Up to the present time, no nickel has been refined in Canada excepting a small amount obtained as a by-product in the treatment of Cobalt ores.

The International Nickel Co. has under construction a large refinery at Port Colborne, Ont., which will be in operation in 1918.

The British America Nickel Corporation is also constructing a refinery plant in Ontario, which will be in operation in 1919.

The Mond Nickel Co. has its refinery in Clydach, Wales.

By the end of 1919, Canada will be one of the greatest refiners of nickel, as well as the greatest producer of ore and matte.

#### MOND NICKEL COMPANY EMPLOYEES SUBSCRIBED LIBERALLY FOR VICTORY BONDS.

When in March last the Mond Nickel Company offered to buy bonds of the 1937 War Loan for their employees, allowing them two years to make repayment, they took advantage of the offer to the extent of \$114,500.

When the Victory Loan was announced, the company offered to purchase these bonds on a repayment plan of twenty-five months at the rate of \$1 per month for each \$100 bond, the interest on the bonds to be paid to the men every six months as it becomes due.

It was felt that, as only one-third of their indebtedness on the previous loan had been repaid, employees would hesitate before incurring further obligations, but the splendid patriotism they have always displayed was again shown by the following totals rolled up for the Victory Loan at the various plants:

Coniston . . . . .	\$169,300
Garson . . . . .	26,300
Worthington . . . . .	25,250
Levack . . . . .	24,400
Mond . . . . .	21,000
Bruce . . . . .	7,850
Wabageshik and Nairn Falls . . . . .	4,000
Canadian Explosives . . . . .	25,000
	<hr/>
	\$303,100

The Coniston figures contain \$50,000 transferred from the old loan. This, with the \$25,000 transferred by the Canadian Explosives, Limited, when deducted from the above total shows the actual cash invested in the Victory Loan to be \$228,100. When we add to this the \$114,500 invested in the issue of March last, we have the magnificent total of \$342,600 subscribed for by employees of the company within the year.

#### SUDBURY DISTRICT DID WELL.

Sudbury, Ont., Dec. 6.—Every home in the Sudbury District has not a Victory Bond, but the recapitulation of Sudbury's wonderful record of the past three weeks in subscribing \$1,541,750 to the Victory Loan is equivalent to one subscriber to 5.35 of the population of the District.

#### BRITISH COLUMBIA MINERAL PRODUCTION IN 1917.

British Columbia's mineral production for the first ten months of 1917 is within 5 per cent. of the mark set at this time last year, according to an announcement by Hon. William Sloan, Minister of Mines. But for labor troubles in the Crow's Nest early in the season and at Trail at the present time, 1917 would show a figure considerably in excess of the banner total of last year, when the mineral production of the province reached a value of \$42,290,462.

"I am highly gratified at the mineral production of the province this year," said Hon. Mr. Sloan, "in view of the labor situation which was experienced in Fernie and elsewhere. Month by month, last year was not more than 5 per cent. better than 1917. The Fernie labor difficulties not only meant the closing down of the coal mines there but it also had a serious effect on the smelters and consequently the mines. But for that we would have beaten our high-water mark of 1916. The recent strike at Trail will also have the effect of keeping us back for the remainder of the year unless government efforts to have an amicable arrangement reached at once are successful."

It is understood that a proposal has been made to have the Trail smelter-men go back to work pending investigation of their claims for an eight-hour day. Every effort is being made to reach a satisfactory conclusion acceptable to the men, who seek shorter working hours such as enjoyed at Grand Forks and Greenwood, and the company which is relying upon an un-terminated agreement.

Should the Trail difficulties be settled at once so that smelter production can be resumed there, it is believed that the 1917 mineral production of British Columbia will be practically forty millions.

#### NORTHERN ONTARIO BUYS VICTORY BONDS.

The Temiskaming district, which includes the Cobalt and Porcupine mining centres, made a splendid contribution to the success of the Victory Loan. The number of persons subscribing was exceptionally large.

Cobalt and Porcupine mining companies subscribed as follows:

Hollinger . . . . .	\$500,000
McKinley-Darragh . . . . .	50,000
Kerr Lake . . . . .	250,000
Nipissing . . . . .	500,000
Mining Corporation . . . . .	500,000
Temiskaming . . . . .	200,000
Dome Mines . . . . .	50,000
Coniagas . . . . .	50,000
McIntyre . . . . .	100,000

The objective for the district was \$468,000. Three times this amount was subscribed in small sums. In addition to this Cobalt and Porcupine mining companies subscribed about \$2,200,000. Of the residents in the district one in five bought Victory Bonds. Cochrane holds the record with an average of one purchaser for every 2.6 people.

#### JUALIN ALASKA MINES.

Work at the Jualin Alaska Mines, Jualin, Alaska, has been suspended pending readjustments and preparations to start on a much larger scale. Work will be resumed before Spring. It is intended to increase the present 10 stamp mill by the addition of a pebble mill bringing the capacity up to 150 tons per day.

### A Successful Year for Cobalt Silver Mining Co's.

The year 1917 has been the most profitable during half a decade for the silver-mining companies of Cobalt. The monthly yield of silver has averaged about 1,650,000 oz. When the year closes an aggregate output of around 20,000,000 oz. will have been recorded and the value of the product will approximate upwards of \$16,000,000.

The grand total of the output since 1904 is now in the neighborhood of 274,000,000 oz. and the net value of the product is about \$154,000,000. The best year in point of value was that of 1912 when the yield was valued at \$17,408,935. With the exception of the banner years 1912 and 1913, the value of the 1917 yield will probably be the best in the history of the camp.

The average price of silver during the year will be a fraction over 80 cents per oz. as compared with 65.66 during 1916 and 49.68 in 1915. The highest quotation for the year was \$1.08 per oz. and constitutes the highest price during the past half century.

The Mining Corporation has maintained an output of around 425,690 oz. of silver per month or at the rate of approximately 5,108,280 oz. per year. The value of the production from this mine aggregates about \$4,086,624 for the year and lends to the mine the distinction of being the greatest silver producer under the British flag. The total production from the Mining Corporation property during the past ten years approximates 28,118,674 oz.

The Nipissing mine during the year has occupied second place to the Mining Corporation. However, since the beginning of operations, the Nipissing has yielded about 48,800,000 oz., thus leading all other mines in the country. The Nipissing has been the greatest dividend payer and has distributed a total of \$17,140,000 among its shareholders, \$1,800,000 of which was paid during the current year.

The silver mining companies which have produced over one million oz. during 1917 are: Mining Corporation, Nipissing, Kerr Lake, Coniagas, O'Brien, McKinley-Darragh, Miller Lake O'Brien. The latter named property is in the Gowganda field, and only within the past fifteen months has come into prominence. The property, like the O'Brien mine at Cobalt, has been privately owned by M. J. O'Brien up until very recently, when a new company known as the M. J. O'Brien, Limited, was formed and under whose control both mines have passed.

A disappointing feature of mining operations here during the past twelve months is the result of the exploration at the 1,6000 ft level, below the diabase sill, at the Temiskaming mine. A responsible engineer has intimated that further expenditure in that zone is not warranted by present indications. On the other hand in the majority of the producing mines, as work has advanced, ore has gradually been proven to exist far beyond previously known limits, and it would appear as though in the aggregate the leading companies will begin 1918 with ore reserves quite on a par with that with which the current year was begun. This is after a production during the past twelve months of over \$16,000,000. Indeed a number of these now famous old mines seem to have gotten into the habit of maintaining ore reserves from two to four years ahead of

current production, which fact tends to afford reasons for the unshaken confidence of their operators.

By reason of their abnormal prosperity, not a few of the leading companies have been carrying on systematic investigations of various prospects further north. The Gowganda silver area has come in for considerable attention, and so has the gold district from Boston Creek all the way north to the Transcontinental railway and west as far as Tashota in the Kowkash area. The areas examined included Boston Creek, Skead Township, Larder Lake, Kirkland Lake, Bourke's Siding, Thackeray Township, Munro, Rickard, Lightning River, Porcupine, Tashota and other fields. As a result nearly every Cobalt company now finds itself interested in one or more gold properties of more or less promise. Perhaps the most fortunate in this respect as so far determined is the Beaver Consolidated, the Buffalo Mines, and the Coniagas. The Beaver only within the past month completed the purchase of the property of the Kirkland Lake Gold Mines at Kirkland Lake, on which perhaps upwards of three-quarters of a million dollars in ore has already been proven to exist. The Teek-Hughes is controlled by the Buffalo Mines interests and ranks as second among the Kirkland Lake mines. The Coniagas has acquired control of the Ankerite and the Maidens-McDonald property in Porcupine, a property which appears to be on a fair way toward becoming a profit yielder. The Mining Corporation of Canada has taken options on several properties both in the Gowganda silver area and the gold district, and also in the Cobalt area. Among the properties optioned in the Anderson claims in Rickard township a few miles north-east from Matheson, and the Hyland claims in Gowganda. They have also purchased the Alexander property in Cobalt, as well as operating the Waldman. The Kerr Lake have the Mondeau claims at Boston Creek under option and are installing a small mining plant. The Crown Reserve, together with the Dominion Reduction Company has acquired the Newray property of Porcupine on a working option.

In addition to having gone far afield in securing mining properties, all the leading companies have been heavy subscribers to the recent Victory Loan, three of the companies taking \$500,000 each. Despite heavy subscriptions, taxes, and the expense attendant upon exploring and paying for new properties, together with the high cost of labor and supplies, the Cobalt companies have during 1917 disbursed an aggregate of \$5,581,703.85 in dividends. This record compares with \$1,958,650.81 for 1916, or a gain of \$623,053. With the high quotations for silver continuing and the complete harmony between the mine operators and their employees, and with huge ore reserves on hand to begin with, the coming year would appear to have an excellent chance of being even more prosperous than that just drawing to a close.

The price of silver for the calendar year is about to establish a record of a fraction over 80 cents per oz., being nearly 25 per cent. higher than the average for 1916. The following summary shows the average price of silver since the beginning of mining in Cobalt, together with a summary of the number of ounces produced and the total value of the product. It will be noted that with the price of silver during 1917 having averaged over 80 cents per oz. the value of the product is second only to that of 1912 and 1913 and greatly exceeding that of the past four years.



**Silver Production of Cobalt District.**

Year	Price per Oz.	Oz. Produced.	Value of Production.
1904 . . . .	57.221	206,875	\$11,887
1905 . . . .	60.352	2,451,356	1,360,503
1906 . . . .	66.791	5,401,766	3,667,551
1907 . . . .	65.327	10,023,311	6,155,391
1908 . . . .	52.864	19,437,875	9,133,378
1909 . . . .	51.503	25,897,825	12,461,576
1910 . . . .	53.486	30,645,181	15,478,047
1911 . . . .	53.304	31,507,791	15,953,847
1912 . . . .	60.835	30,243,859	17,408,935
1913 . . . .	59.791	29,681,975	16,553,981
1914 . . . .	54.811	25,162,841	12,765,461
1915 . . . .	49.684	23,730,839	11,742,463
1916 . . . .	65.661	19,874,940	12,622,849
1917 (ind.)	80.224	19,600,000	16,000,000

**GROCH CENTRIFUGAL SYSTEM OF FLOTATION.**

Five years ago flotation was practically unknown on the American Continent and the rapidity with which it has advanced may be gauged from the fact that today it is responsible for the treatment of more than 30 000 000 tons of ore annually in the United States alone. It owes its popularity to its increased efficiency over other methods and to the fact that it can be installed and operated in appliances of the simplest and most inexpensive kind.

The greatest field for operation lies in the recovery of copper from sulphide, for which flotation is eminently suited, but its application has now become so extended as to include the treatment of ores containing gold, silver, lead, zinc and practically every other well known metal. The most easily floated minerals are those of a flaky character with a bright lustre or greasy surface. Graphite and molybdenite can be cited as extremely favorable examples. Every other mineral, however, has certain natural floatative properties, the degree of which determines the ease or difficulty with which it can be recovered by the flotation process. The conditions necessary for successful flotation are that the mineral be crushed to a fineness ascertainable only by experiment and that it be brought into intimate contact with a plentiful supply of minute air or other bubbles in a solution containing an oily, greasy or soapy substance, which on agitation will develop a froth.

The juvenile experiment of blowing soap bubbles illustrates the main principle underlying flotation, while that of dropping two or three grapes in a glass of effervescent "soda" gives an impressive demonstration of how those bubbles collect on the floatative substances, and buoy them to the surface. The solution is permeated with minute bubbles and these collect on the surfaces of the grapes and adhere until a degree of buoyancy is reached to effect their flotation.

By the Groch Centrifugal System of flotation, the crushed ore in the form of a pulp is aerated and oiled by means of centrifugal impellers, each of which consists of a hollow vertical shaft, and a centrifugal runner. The runner is so divided that during operation its upper part draws down air through the hollow shaft while its lower part sucks up the pulp through its hollow hub and ejects it violently at the periphery. By this action a vacuum is created all round the zone of discharge, air in large volumes is drawn into the impeller, atomized and forcibly discharged into the pulp as a shower of infinitesimally

small bubbles. These, because of their minuteness and of the pressure to which they are subjected, tend to become absorbed in the pulp and to re-form in nascent state round each valuable floatative mineral particle as a nucleus. Oil, drop by drop, enters through the same hollow shaft and is ejected into the pulp as a fine spray. This action is repeated with each impeller of the machine so that with the standard six-impeller machine the valuable mineral particles are subjected to six separate flotation attacks during the period that the pulp is under treatment and the extraction is necessarily very effective.

For purposes of experiment a glass-fronted model is manufactured which in itself is a complete flotation unit, ready to run. In this model installation, every detail of the process of aerating, oiling, collecting and separating the valuable mineral from the ore being tested is in full view of the observer.

Flotation is making such rapid progress that a machine of some capacity must now, almost of necessity, find a place in the equipment of every organization connected with the testing of ores, development of mining properties or recovery of industrial minerals.

**PERSONAL.**

Mr. J. B. Tyrrell has been nominated for the presidency of the Canadian Mining Institute.

Mr. Hugh Marriott is to succeed Mr. Edgar Taylor as president of the Institution of Mining and Metallurgy, London.

Mr. W. E. Segsworth, Administrator of Vocational Training, has returned from a visit to the Western Provinces. He is now in Ottawa.

Mr. John Stirling, Inspector of Mines of Alberta, was in Toronto last week.

President A. A. Cole of Cobalt, Mr. D. B. Dowling of Ottawa and Mr. Mortimer-Lamb of Montreal were in Toronto last week for a meeting of the Council of the Canadian Mining Institute.

District newspapers in British Columbia have announced that Mr. F. S. Norcross, Jun., of Copper Mountain, Similkameen, superintendent of mines for the Canada Copper Corporation, recently passed examination to rank as Captain in the United States Engineering Corps, and that he expects to be included in an early draft for service in France.

**MOLYBDENITE MINING IN QUEBEC.**

The molybdenite industry in Quebec is progressing, and it is not unlikely that this province will show a world's record of its production for 1917. The results of the diamond drilling at the Moss mine, at Quyon, operated by the Dominion Molybdenite Company, are said to have been very satisfactory, and it is claimed that a very large tonnage of ore has been blocked out. The concentrating mill has been completed, and is treating 200 tons of ore a day. Practically all the molybdenite produced is converted into ferro-molybdenum in Ontario furnace works. The Wood Molybdenite Company is proceeding with the development of the Squaw Lake property, and with the construction of its concentrator. The mill will be ready to start late in December or early in January. It is a small plant, intended to treat 20 tons a day, and only the rich ore will be put through at first.

# Ontario's Mineral Wealth

The rapid growth of Ontario's mineral industry may be gleaned from the following figures. The drop in 1914 is attributable to the outbreak of war in that year.

Year.	Value.	Year.	Value.
1893 .....	\$ 6,120,753	1914 .....	\$46,295,959
1903 .....	12,870,593	1915 .....	54,245,679
1913 .....	53,232,311	1916 .....	65,303,822

**ONTARIO IS CANADA'S PREMIER MINERAL PROVINCE, the 1916 production being 45 per cent. of the total output from Canada.**

*Nickel:* Sudbury produces 80 per cent. of the nickel of the world, and in 1916 the nickel-copper matte output contained 41,299 tons of nickel valued at \$20,649,279, and 22,430 tons of copper worth \$8,332,153.

*Silver:* Chiefly from Cobalt and outlying camps, 20,007,367 ounces of silver, worth \$12,703,591, were produced in 1916. The total silver production from the Cobalt camp up to the end of 1916 was 255,322,297 ounces, valued at \$135,829,548.

*Gold:* For 1916 the gold output was 497,833 ounces, valued at \$10,339,259. From the Porcupine Camp, the total production to the end of 1916 was \$28,200,322. Ore reserves of the producing mines at Porcupine are estimated at \$50,000,000. The Kirkland Lake camp comes next in importance.

**DIVIDENDS PAID TO JUNE 30th, 1917, EXCEEDED \$70,000,000 FROM THE COBALT SILVER CAMP, AND \$10,000,000 FROM THE PORCUPINE GOLD CAMP.**

The total valuation of the chief metals produced in Ontario up to the end of 1916 is as follows:

Silver	\$151,428,500	Gold	\$33,661,618
Nickel	89,128,164	Copper	33,152,628
Pig Iron	76,544,181	Cobalt	3,180,000



# Silver Ore from Cobalt, Ontario

The silver deposits discovered at Cobalt, Temiskaming district, Ontario, in 1903, have proven to be wonderfully rich. The district has now produced about 275,000,000 oz. silver for which the companies received about \$152,000,000. Of this amount the companies have distributed in dividends over \$70,000,000

The beautiful pink color of the weathered specimen is due to cobalt bloom or erythrite, which is formed by the weathering of smaltite and smaltite-chloanthite. The latter minerals are characteristic of the silver deposits of the Cobalt district and hence cobalt bloom is characteristic of surface outcrops of the deposits.



A Weathered Specimen of Cobalt Ore

or just about one-half. The large profit made is not surprising when it is known that much of the ore mined is as rich as the specimens shown here.

The illustrations are of typical high grade ore. On this page is shown a weathered specimen. On the opposite page is reproduced a piece of unaltered ore that has been cut and polished.

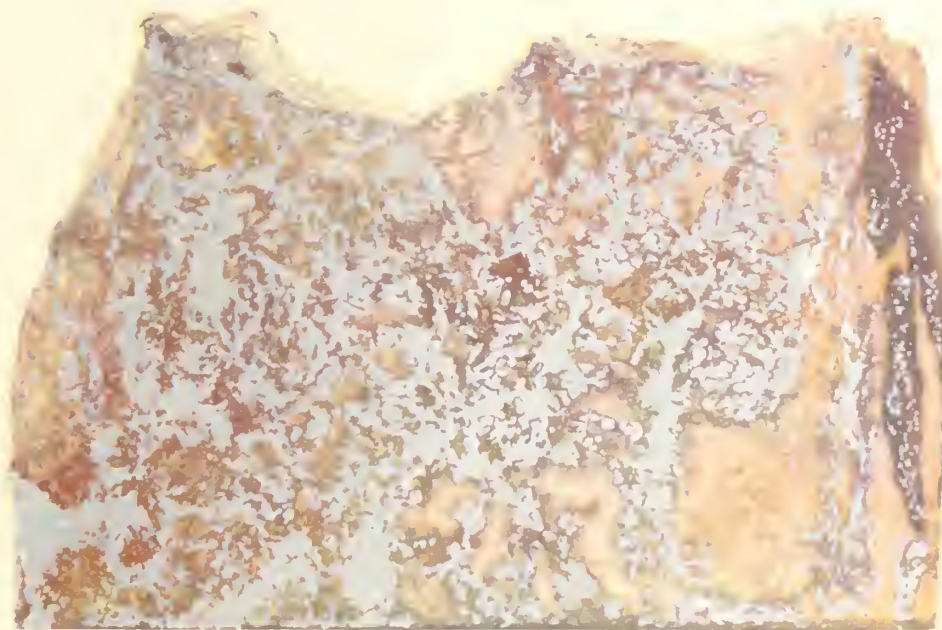
The green colored area is nickel bloom which results from the alteration of niccolite. Niccolite occurs with smaltite in most of the silver deposits, but the weathered product is not so striking as cobalt bloom and the prospectors soon learned to look for pink stains. A peculiar feature of the nickel bloom is that the presence of a small percentage of the cobalt bloom

neutralizes its color and the mixture is a dull white substance that does not attract the eye.

One of the commonest gangue minerals in the Cobalt silver deposits is calcite; but there is probably more dolomite than calcite. Quartz is not an important constituent of the veins, though there is much

Some occur in the older Keewatin rocks. All occur near the diabase, above or below the contact or its probable extension.

As the Cobalt mines were developed a larger and larger percentage of low grade ore was broken. Excellent progress has been made by Cobalt metallur-



A Polished Specimen of Cobalt Ore

of it in the wall rocks and consequently in the milling ore.

Such ore as is here illustrated occurs in thin veins commonly but a few inches thick. Most of these veins stand vertical or nearly so, in flat lying sedimentary rocks of the Cobalt series (Huronian). Others occur in a sill of diabase that intrudes the Cobalt series

gists in treating this low grade material and a large quantity of ore assaying around 20 oz. silver per ton is being profitably treated. There still remains however much high grade ore. The Nipissing company alone had on Jan. 1, 1917, a reserve of 3,673 tons which averaged 1,370 oz. per ton in addition to 163,721 tons of milling ore averaging 25.2 o.





PROVINCE OF ONTARIO

DEPARTMENT OF LANDS  
AND FOREST & MINES  
BUREAU OF MINES

## GEOLOGICAL SKETCH MAP OF ONTARIO



The area of Ontario is 407,262 square miles, 70 per cent. being pre-Cambrian, which is pre-eminently the metal-bearing formation of the Province.

Ontario's mineral resources cover practically the entire list of metallics and non-metallics with the exception of tin and coal.

The producing camps are readily accessible by railway, the climate is invigorating and healthful, water power is near at hand, and other conditions are favorable for mining.

FOR GEOLOGICAL MAPS, ILLUSTRATED REPORTS, MINING LAWS, AND LIST OF PUBLICATIONS, APPLY TO

ONTARIO BUREAU OF MINES

PARLIAMENT BUILDINGS  
TORONTO, CAN.

## SPECIAL CORRESPONDENCE

## NORTHERN ONTARIO.

**Burnside Property Will Be Developed.**

The deal has been closed whereby the Burnside property at Kirkland Lake comes under control of the Aladdin-Cobalt mining company. The Burnside is looked upon as one of the most important idle properties in the Kirkland Lake camp, and lies adjacent to the Tough-Oakes mine. From the geological conditions and the number of veins containing commercial ore already opened up on the Burnside, it would appear that the prospects for the property eventually becoming a valuable asset to the Aladdin-Cobalt are very good. The Aladdin-Cobalt company also owns control of the Chambers-Ferland mine at Cobalt, and through the development of the latter property is in a strong financial position to carry on the work on the new property. Development of the Burnside is to begin at once.

**Will Help Soldiers to Hold Claims.**

Mr. T. E. Godson, mining commissioner, has requested the Hon. Mr. Ferguson to have an order-in-Council passed, carrying the license of the prospector serving in Canada's army, and making unnecessary the performance of work on mining claims staked on his license until a specified time after the soldier's discharge. It is understood this order will be passed at once.

**Teck-Hughes Plant Will be Doubled.**

The directors of the Teck-Hughes visited the property recently and decided on increasing the present plant to double its capacity or bringing its treatment of 160 tons of ore per day into effect at the mine. The underground developments at the property during the past few months have been of a highly encouraging nature, and the ore reserve has been added to extensively. At the present time a winze is being sunk from the 600 to the 800-ft. level, where a crosscut will be run to a point directly under the main shaft and a raise put up to connect the latter with the lowest working of the mine. It is expected that the increased milling facilities will be available for the treatment of ore early in the coming spring.

**Plant Installed at Whelpdale.**

A small plant has been installed on the Whelpdale property at Porenpine and is now in operation. Underground development will be proceeded with at once. This property is situated a little north-west from the west end of Gillies Lake and comprises 160 acres.

**Changes at Tough-Oakes.**

Mr. D. H. Angus, of the Right of Way mines, has taken over the management of the Tough Oakes mine at Kirkland Lake, succeeding Mr. Chas. O'Connell, who has held this position for a number of years and who, with Mr. Murphy, captain at the Tough-Oakes, will direct his attention to the operation of the Patricia Syndicate property at Boston Creek, in which Mr. O'Connell is interested.

**Kerr Lake Company Developing Claims in McElroy Township.**

The Mondacan claims in the township of McElroy (a portion of the Boston Creek district) have been taken under option by the Kerr Lake Mining Company of Cobalt, and development of the claims has already commenced. A road has been built to the property and a small mining plant will be installed as soon as possible.

However, sinking will be proceeded with by hand steel until such time as the steam plant has arrived and been erected. These claims were under option to the Buffalo Mining Company of Cobalt last spring, the latter, however, were developing the properties as a bismuth proposition and evidently the results encountered were not found satisfactory. Good gold values occur in a four-foot vein on the property, and now that the Kerr Lake interests have taken an option, the merits of the property will be made known. Encouraging gold values have been encountered on a number of other properties in the vicinity of the Mondacan claims, but the nearest property on which extensive development work has been done is the Boston Gold Leaf, which is on the line of Boston and McElroy townships. Results obtained on the Boston Gold Leaf were fairly satisfactory.

**Kirkland Lake Production Will Be Large.**

With the completion of the mills at present under construction in the Kirkland Lake camp, the milling facilities for the district will aggregate 530 tons of ore per day. The average gold content of the ore so far encountered in the camp should make possible a gross yield of approximately \$200,000 per month, or close to two and a half million dollars annually. The outlook for materially increasing this production during the following two years to more than double that of the present seems exceptionally bright.

**Opening Up Lightning River District.**

A winter trail is being cut from Kirkland Lake to the scene of the recent gold discoveries in the Lightning River District, which is between 30 and 35 miles distant. The trek to this district is increasing and already upwards of a hundred claims have been staked. Development work has commenced on the discovery claims and if this proves satisfactory, the coming summer should see considerable activity in this district.

**Murray-Mogridge.**

The shaft at the Murray-Mogridge property at Wolfe Lake has reached a depth of 200 ft. and is being sunk to the 300-ft. level. A station has been cut at the 100 and 200-ft. levels and drifting in both directions on the vein is progressing with satisfactory results. At the present time the vein is the full width of the shaft and the values are said to be double those encountered on the surface. During the present summer a vein now designated as No. 6 was located about 300 ft. west of the No. 1, and has since been stripped for a distance of 20 ft. and has an average width of five ft. The average values encountered on the No. 1 vein are said to be close to \$12, while those encountered on the No. 2 vein are said to have given an average of \$13 per ton. Developments at this property to date have proven very satisfactory.

**Installing Milling Machinery at Lake Shore.**

The mill building at the Lake Shore mine at Kirkland Lake has been completed and the installation of machinery is now in full swing. It is anticipated that this will be completed in January and the production of bullion should commence early in the new year. From the days of its staking to the present time this property has been in the hands of Mr. Harry Oakes, the pioneer of the Kirkland Lake camp. Largely through his efforts the mine has been worked through its various stages until now it is in the hands of becoming a producer.

**Kirkland Lake Gold Will Erect Mill.**

The third payment for the property of the Kirkland Lake Gold Mining lease held by the Beaver Consolidated



of Cobalt on the 23rd of November. The purchase price of the property was \$300,000 spread over four payments of \$75,000 each. Upon the payment of each instalment a certain amount of the stock of the company was handed over to the purchasers. It is about two years since the property was first taken under option and development work since that time has been carried to a depth of 700 ft., with highly satisfactory results, and upwards of eight thousand tons of ore has been placed on the dumps. The total ore reserves are understood at the present time to aggregate not far short of a million dollars. The preliminary work of erecting a mill of 150 tons capacity is now under way.

#### **Bourke's Mines.**

The work of erecting an up-to-date set of camp buildings is now under way at the Bourke's Mines (formerly known as the Anderson Farm at Bourke's Siding). An extensive exploration plan has been outlined and developments will be watched with more than usual interest, owing to the fact that surface showings were exceptionally rich.

#### **Miller-Independence Using Groch Flotation Process.**

The first gold mine in Northern Ontario and perhaps in the Dominion of Canada to commence the treatment of ore by the oil flotation process is the Miller-Independence at Boston Creek. After a two-months' run the total extraction is said to average about 94 per cent. The milling equipment consists of a Blake rock crusher, a 4 ft. x 5 ft. ball mill, drag classifier, two amalgamating plates, mercury trap, cones and a Groch flotation machine. The grade of ore being treated is around \$8 per ton and the capacity of the mill is about thirty-five tons per day. About 30 per cent. of the gold is recovered on the amalgamating plates, 30 per cent. in the mercury traps and the balance in the flotation concentrates, which assay about \$200 to the ton.

#### **Lightning River District.**

It is reported here that the Lake Shore Mining Co. of Kirkland Lake have acquired an option on a group of claims lying next to the original discovery in the Lightning River district, on which a sensational discovery of gold has been made.

#### **Leading Gowganda Mine Is Now a Big Producer.**

The Miller-Lake-O'Brien mine at Gowganda is now yielding upwards of 84,000 ounces of silver per month, and at the present time this mine holds seventh place among the silver producers of the Dominion. This record is all the more remarkable when it is remembered that just a little over a year ago only sufficient ore was in sight to about pay the expenses of operation. Much of the ore coming from the lower workings of this property carries values of 5,000 to 10,000 ounces to the ton and sometimes the ore is found so rich that it is hard to reduce it to a size convenient to handle. Owing to the fact that the company is a close corporation, very little information has been given to the public, with the result that all estimates as to the probable ore reserves of the mine are more or less guesswork. However, the fact that the 1917 production will approximate nearly 1,000,000 ounces, leads to the natural conclusion that the ore reserves are very large. It is not surprising that the Cobalt mining companies are evincing more than usual interest in the promising prospects in this district.

#### **Prospecting at Tashota.**

Prospects on the Nelson-Hull and Kipper claims in the Tashota section of the Kowkash gold area are said

to be exceedingly bright. A body of ore one hundred feet in width and said to be carrying encouraging values has been uncovered. The surface assays are said to have proved ore of a commercial value, and it is understood efforts are being made to get the proposition in line for exploration at depth.

#### **Patricia Syndicate Is Developing Its Boston Creek Property.**

A force of about thirty men is employed at the Patricia Syndicate property, in the Boston Creek district and the shaft is being driven at the rate of about three feet every twenty-four hours. The surface showings on this property are among the most sensational in the North Country. The first vein discovered was not wide, but was exceedingly rich. However, a wider vein was uncovered some distance south and paralleling the original discovery. This latter vein also carries spectacular showings of visible gold, and the property has now found its way into strong hands. Mr. Charles O'Connell, formerly manager at the Tough-Oakes at Kirkland Lake, is now in charge of operations, and it is understood the plan of development includes the sinking of two shafts to a depth of 200 feet, from which level lateral work will be undertaken. When completed this should go far towards proving the stability of the ore bodies of the camp.

#### **Shaft Sinking and Diamond Drilling Rickard Property.**

A shaft is being sunk on the main vein of the Rickard Township property, recently taken under option by the Mining Corporation of Canada. Preparations are also under way to diamond drill the property at the earliest possible date, in an endeavor to prove more fully the merits of the claims with the least possible delay.

#### **United-Kirkland.**

Developments at the United-Kirkland property are understood to be encouraging. The shaft has been sunk to a depth of about 100 feet, during the course of which three veins were encountered. The first vein on which the shaft was started left the working a few feet below the surface, the shaft being sunk perpendicularly, while the veins have a dip to the south, similar to that of nearly all other veins in the Kirkland Camp. A few feet further down in the working a second vein was encountered and at a depth of 45 feet a third one entered the working and disappeared again about the 65-foot depth. At the 100-foot level, where a crosscut will be run in an endeavor to tap the three veins met with in sinking the shaft. A small steam plant supplies the power for the mine and three shifts are being worked. About fifteen men are employed.

#### **Drilling Hayden Property.**

The diamond drill hole at the Hayden mine in Porcupine is down a depth of about 700 feet. It is intended to drill the property to a depth of 1,000 feet. The core-splitter (more or less of an innovation in the Porcupine camp) is giving good results. The general exploration work at the Hayden is proving very promising.

#### **Porcupine V. N. T.**

A policy of aggressive development of their property was decided on at a meeting of the directors of the Porcupine V. N. T., held in New York recently. The plan to be followed will be the extension of the workings at the 600-foot level, and also the sinking of the

main shaft to a depth of 800 feet. This latter decision should prove gratifying to the shareholders, owing to the fact that excellent results have been encountered on neighboring properties at greater depth. It was also decided that all the ore for the 100-ton mill will hereafter be taken from the underground workings, instead of a portion of it coming from the big dump on the surface. Upwards of sixty men are employed on the property and the mine is in excellent physical condition.

An agreement has been reached whereby the Thompson-Krist property will be worked from the 400-foot level of the Porcupine V. N. T. working. A crosscut is to be driven at this level on to the Thompson-Krist, where the rock formations are known to be favorable to ore depositions, and the prospects of finding commercial ore are believed to be good.

#### McIntyre's Good Showing.

For the first nine months of the present year the McIntyre-Porcupine mines yielded an average of \$132,842 per month. However, during recent months this average has approximated about \$140,000 per month, or at the rate of \$1,680,000 per annum. With the grade of ore at this mine ranging around \$11 to the ton and the costs of mining running close to half this amount, it will be seen that after producing the amount required for the payment of the quarterly interim dividend of 5 per cent., the company would still be able to lay aside a considerable surplus. The dividend requirements call for \$744,000 per year and the amount being produced under the present unfavorable conditions runs close to \$840,000 in net profit. Under more favorable economic conditions it is quite evident McIntyre could do much better.

#### Important Discoveries at Hollinger Mine.

Recent developments on the Hollinger-Consolidated property at the 400-foot level of the Miller-Middleton section are exceedingly good. This latest development has shown an orebody which is 71 feet in width and carries average values of \$28.60 per ton. This is perhaps the largest body of high-grade gold ore ever encountered in America, and coming on top of the recent developments in other portions of this mine appears to verify the assertion that the Hollinger is perhaps the greatest gold mine in the world. During the year 1916 the mine was equipped with milling equipment sufficient to handle about 1,800 tons of ore per day. The machinery installed this year furnishes facilities for handling approximately 2,800 tons per day. The ultimate aim of the management is to increase the equipment until it will be possible to treat from 3,800 to 4,000 tons of ore per day. Under present conditions it is impossible to find sufficient men to carry on maximum production, and the output for the time being will perhaps be kept at about \$100,000 per month. This production is resulting in the accumulation of a considerable surplus. The recent developments on the 400-foot level of the Miller-Middleton is perhaps the most important in the history of Porcupine. When it is remembered that the annual report for 1916 stated that the average value of ore in the mine was less than nine dollars per ton, the importance of the discovery of the tremendous body of high-grade ore in this newer portion of the mine may be realized.

#### Newray.

The Crown Reserve Mining Company of Cobalt, who recently optioned the Newray property at Porcupine are understood to be meeting with encouraging re-

sults. The ten stamp test mill on the property is running, and it is reported that a satisfactory mill head has been established. The new control is going about the exploration and development of the property in their usual practical and systematic manner.

#### Davidson.

The equipment for the erection and installation of the new mill for the Davidson property is now on the ground and the work of installation will be proceeded with at once, and if weather permits, it is expected the plant will be completed and in operation in schedule time. Some delay was experienced in the delivery of certain parts, but, according to the latest advice, this has been overcome.

#### Dome.

At a meeting of the directors of the Domes Mines, held on November 26th, it was decided to close down the mill for the present and to continue shaft sinking and development on the known ore bodies, besides keeping the diamond drills at work on exploring operations. It is understood that a sufficient number of men is available to continue the development of the property on a considerable scale, and that when normal conditions are restored the development of ore reserves of the property will be unusually well advanced.

While nothing official can be learned of developments at the 800-foot level of the mine, these are said to be of a decidedly bullish nature. It was stated some weeks ago that the crosscut at this level should tap the large 117 foot wide orebody indicated by diamond drilling about a year ago about the 15th of November. It is a fact that the crosscut is now either actually in this orebody or very close to it. It is also interesting to note that according to the annual statement of the company the ore encountered in this huge body was of a value at least three times as high as the average run of the mine. The shortage of labor is still keenly felt at the mine, but this will be a permanent retarding factor, being attributable only to the war.

#### McKinley-Darragh in Good Shape.

Producing bullion at the rate of 86,174 fine ounces per month, and with the price of the product running around \$50 per ounce, the McKinley-Darragh Savage is in a financial position equal to the best days in its history. The gross annual yield at the present rate of production would aggregate approximately \$878,974. Developments at the lower workings of the mine have proved the existence of ore to a larger extent than was anticipated. The new oil flotation plant will also soon be in full operation, and there is every reason to expect that 1918 will be one of the most prosperous years in the history of this mine. The regular three per cent. dividend, which is due the first of January, will bring the aggregate dividend disbursements up to \$5,146,197.34, which is equal to 229 per cent. of the issued capital stock of the company.

#### Mining Corporation's Big Production and Expansion.

In point of production the Mining Corporation of Canada continues to lead all silver producers under the British flag. Silver is now being produced at this property in Cobalt at the rate of 425,690 ounces per month, or upwards of seventeen tons of bullion every thirty days. The valuation of the production for the present year is estimated at approximately \$4,086,624.00, and the production in ounces of silver will be 5,108,280. This is a wonderful record and eclipses all previous performances of this company. The rate of production has shown a steady increase since the year 1909, when



the total production amounted to 442,254 ounces. When the fact is taken into consideration that the price of silver during the past year has averaged nearly thirty per cent. higher than during the preceding year, it naturally follows that the returns at this mine will be correspondingly higher than they were during the year 1916.

The company has recently purchased the Alexandra property and the Waldman in the Cobalt camp, taken an option on the Hyland claims at Gowganda, and commenced development under option, on the recently discovered claims in the Rickard Township gold district. It is also reported that they are negotiating for purchases of the control of the stock of the Lucky Baldwin mine at Kenogami. Thus it will be seen that the company is pursuing an aggressive plan of expansion and is fully alive to the opportunities presented in the North.

#### **Temiskaming.**

The report of Mr. Douglas A. Mutch, on ore reserves and the general outlook at the Temiskaming mine, has proved to be of general interest to the public, as well as enlightening a good many of the shareholders as to the actual conditions prevailing, and has verified preceding reports in every detail. Mr. Mutch's report deals plainly with the conditions existing at the 1,600-foot level of the property below the diabase, and the shareholders are told that there is very little chance of any reward for the sinking of this deep working to the lower contact. There are very few of the shareholders who will find fault with the management for this enterprise, as it was part of the plan of exploration which must necessarily be carried out before ascertaining whether or not the mine was to occupy a place among the has-beens, or find below this contact a new source of revenue to lengthen the life of the mine.

#### **Coniagas Is Developing Gold Properties.**

After having already paid to its shareholders eight and one-half millions of dollars, the Coniagas Mining Company of Cobalt is still yielding up large quantities of silver, and the present year's production will probably exceed one and a quarter million ounces. During the past ten months production has been maintained at an average of 108,479 ounces per month. The value of this output is around \$87,000 per month, or upwards of \$1,000,000 per year. The Coniagas has also comparatively recently acquired two gold properties in the Poreupine district, which, according to present indications, should develop into profit-producers. These properties are the Ankerite and the Maidens-McDonald, which lie adjacent to each other, and are being developed from a three-compartment shaft which is being sunk to the 500-ft. level of the Ankerite property.

#### **Peterson Lake.**

The half-yearly report of the Peterson Lake Mining Company as of October 31st is as follows: Cash in banks, \$30,992. Unpaid dividends, \$3,667. Balance, \$27,324. Cash on hand, \$44.

Underground work to the extent of 722.5 feet was done during the half year; 2,896 pounds of ore of various grades was developed. An estimate of the value of dumps and slimes not included in the dispute with the Dominion Reduction Company is estimated at \$300,000.

Since the issuing of this report a decision has been given in favor of the company for the large quantity of tailings on their property from the mill of the Do-

minion Reduction Company, which are said to have considerable value.

After thoroughly prospecting the Susquehanna property at the 200-ft. level, it was decided to move the plant to the Mercer workings which adjoin the Nipissing, McKinley-Darragh, Seneca Superior and Provincial mines, and where it is thought the possibility of striking good silver values is no promising.

#### **Adanac.**

Another shoot of rich ore has been encountered in the working at the North drift of the Adanac at the 310-ft. level, and ore of a sufficiently high grade to bag is being developed. The vein at this point is about three inches in width and is composed of cobalt, with a heavy spattering of native silver. It is agreed by the best geologists in the camp that there are equal chances of encountering orebodies similar to those developed on the Temiskaming property on the Adanac, as the geological conditions are very similar.

#### **Provincial's New Mill in Operation.**

A new mill, with about forty tons per day capacity, has been put in operation at the Provincial mines at Cobalt. A number of improvements have been added to the old crushing plant and a Groch flotation machine has been installed to treat the slimes. Developments at the property recently have been of a very encouraging nature.

#### **Green Meehan.**

It is reported that a discovery of more than ordinary importance has been made on the old Green Meehan property at North Cobalt, and operations at this mine will be speeded up in the near future. The original shareholders of the company will not derive any benefit from this discovery, owing to the fact that the property was sold a year or more ago to liquidate debts, and is now privately owned.

#### **Another Gold Discovery in Skead Township**

Another gold discovery is said to have been made in the Township of Skead, on the Crawford claims, which are situated on lot 5, concession 6. The outlook in this district is indeed growing more promising each day, and at the present time the great drawback to the development of the promising properties seems to be the lack of transportation and exploration capital. At present the only road to the district is from Englehart, a distance of about 24 miles. A short cut could be made by extending the road from the Miller-Independence mine at Boston Creek to the promising section of Skead, which is a distance of about eight miles. The road from the Miller Independence to the Boston Creek Station is fairly good at the present time. This would reduce the distance from the track to the Skead section by about half its present length.

#### **Gowganda.**

It is expected that by the new year the place will be installed and underground operations underway at the Castle property in Gowganda, which adjoins the Miller Lake-O'Brien on the south-east and is situated on the continuation of the contact along or near which the latter company is encountering its high-grade ore. A dozen or more men are employed at the property and very encouraging silver values have already been encountered. The distance from Elk Lake, the nearest railroad point, to this property is about twenty-seven miles.

#### **Canadian Kirkland.**

In the shaft on the No. 2 vein of the Canadian Kirkland property at Kirkland Lake visible gold is in evi-



dence at a depth of 30 feet. This vein is about sixteen feet wide and has been uncovered on the surface for a distance of approximately 600 ft. Another shaft has been sunk on what is known as the No. 1 vein to a depth of 35 feet, and very encouraging values were encountered. At present sinking operations are being conducted by hand and a horse and whim are used for hauling the ore out of the shaft. It is the intention of the company to sink to the 100-ft. level and then cross-cut to encounter the No. 1 vein at this depth, as well as continue other lateral work. New camp buildings are being erected and everything is being made ready for the installation of a mining plant in the near future.

#### NOVA SCOTIA.

The Amalgamated Mine Workers of Nova Scotia have served the colliery operators in the Sydney District with notice of termination of the existing wage agreement as at the end of the year, and have made a demand for an increase in wages ranging from a minimum of 30 per cent. to 75 per cent. advance on existing rates. In face of the large increases given to the colliery workers during the past two years, which have averaged from 35 to 45 per cent., the operators do not consider the demand of the A.M.W. is justified by the circumstances. The main argument of the A.M.W. appears to be that the rate of wages paid in Nova Scotia is less than that paid in the coal mines of the Western Provinces. It is probable, however, that when the Eastern miner comes to the year end he finds himself in a better financial position than the Western miner, and this after all is the true measure of earning capacity. Western conditions cannot be compared with Nova Scotia conditions, as they differ not only in the ratio of living costs, but in the mining conditions. If the miners of Nova Scotia desire to introduce the western scale of wages it will be necessary also to introduce the western scale of rents, and of food and clothing costs, on the one side, and the western scale of coal selling prices on the other. In this connection it is worth noting that many eastern miners have gone west and have been glad to beg passage money home after their savings had been exhausted.

It is so manifestly impossible that the coal operators will be able to grant the increase asked by the A.M.W. that a failure to agree may be confidently anticipated. The appointment of a Conciliation Board may therefore be looked for, as it is certain that no stoppage of work can be tolerated at this time.

Arising out of the Waterford Explosion in July last three prominent mining officials have been indicted by the Grand Jury in Sydney on a charge of manslaughter resting on alleged negligent mining practice. The officials in question are two members of the staff of the Dominion Coal Company, the Superintendent and the Manager of No. 12 Colliery, and the Deputy Inspector of Mines, who is an officer of the Provincial Department of Mines, reporting to the Inspector of Mines. The Coroner's Jury which sat upon the victims of the explosion last August brought in a verdict of gross negligence in mining against persons not named, but did not attempt to justify the verdict by naming any specific breaches of the Coal Mines Regulation Act, nor has it yet been suggested that any such breaches occurred prior to the explosion. A Commission composed of the most capable mining men in the Province, and comprising among its numbers four or five representatives of the Amalgamated Mine

Workers, were unable to assign blame to any person, yet singularly enough, at a Convention of the A.M.W. in Sydney in October, a resolution was passed asking for the dismissal of the officials who were afterwards indicted by the Grand Jury, and for the cancellation of their certificates of competency. The most surprising feature in this incident is the indictment along with the Dominion Coal Company's officials of the Deputy Inspector of Mines. It has not hitherto been held that a representative of the Government held a joint responsibility with the operators of a coal-mine in the Province. On the contrary it has hitherto been supposed that the Inspector of Mines was the superior officer of the mining officials of the Province, and in this connection it may be noted that at the inquest the Inspector of Mines refused to allow the Deputy Inspector to give evidence, holding that the Deputy Inspector was a person empowered by the law to hold investigations and interrogate witnesses, and could not properly be subpoenaed as a witness before a Coroner's Jury enquiring into a mining accident. If the Deputy Inspector of Mines is held to be jointly responsible with mining officials working under his direction a new precedent will be established and one that may have some interesting consequences.

The Amalgamated Mine Workers at the Sydney Convention passed a resolution asking the Provincial Government to establish a compulsory scheme of sickness relief societies at the collieries to which the Government and operators should contribute 80 per cent. of the cost and the workmen 20 per cent. This request lies entirely outside the question of workmen's compensation, which is being administered by the Provincial Workmen's Compensation Board. The Dominion Coal Co. have since the beginning of the year been contributing the sum of 25 cents per month per man to the sickness society, but in face of the unreasonable attitude disclosed by the resolution referred to the Company has discontinued its subscription. As the contribution of the workmen is inadequate to ensure the permanence of the Society on the present basis of benefits the Directors have commenced proceedings to wind up the Society so as to conserve the reserve funds for the benefit of the widows and children and disabled members of the Society now on the Fund which the Society has just sufficient funds to enable it to liquidate in full. For the first time therefore in at least 30 years the Dominion Coal Company's workmen will be without a sickness relief society, a condition of affairs which is much to be regretted, and which the Company has done its very best to prevent.

The seventh annual meeting of the Columbia Section of the American Institute of Mining Engineers, which section has its headquarters in Spokane, Washington, was held at Kellogg, in the Coeur d'Alene district of Idaho, on November 17. There was a good attendance of members and others interested. At the business meeting, Mr. S. S. Fowler, general manager for the New Canadian Metal Company, operating at Riondel, Kootenay lake, B.C., was elected chairman of the section for the ensuing year, and Mr. J. Cleveland Haas, of Spokane, also well known in Boundary and West Kootenay districts of British Columbia, in both of which he has been associated with many mining enterprises during the last twelve years, was elected vice-chairman. Mr. L. K. Armstrong, also of Spokane, another member of the Canadian Mining Institute, was re-elected secretary and treasurer.



# ∴ **Markets** ∴

## TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.  
 Cobalt oxide, grey, \$1.65 per lb.  
 Cobalt metal, \$2.25 per lb.  
 Nickel metal, 45 to 50 cents per lb.  
 White arsenic, 15 cents per lb.  
 Dec. 11, 1917—(Quotations from Canada Metal Co., Toronto).  
 Spelter, 12 cents per lb.  
 Lead, 9 cents per lb.  
 Tin, 74 cents per lb.  
 Antimony, 17 cents per lb.  
 Copper Casting, 34 cents per lb.  
 Electrolytic, 34 cents per lb.  
 Ingot brass, yellow, 20 cents; red, 25½ cents per lb.  
 Dec. 11, 1917—(Quotations from Elias Rogers Co., Toronto).  
 Coal, anthracite, \$9.85 per ton.  
 Coal, bituminous, nominal, \$9.00 per ton.

## NEW YORK MARKETS.

Connellsville Coke—  
 Furnace, 6.00.  
 Foundry, 7.00.  
 Crushed, over 1-inch—  
 Beehive, 7.30.  
 By-product, 6.50.  
 Straits Tin, spot, f.o.b., nominal, 85.00 cents.  
 Copper—  
 Prime Lake, \*23.50 cents.  
 Electrolytic, \*23.50 cents.  
 Casting, \*23.50 cents.  
 Lead, Trust price 6.25 cents.  
 Lead, outside, nominal 6.25 to 6.50 cents.  
 Spelter, prompt western shipment, 7.80 to 7.92½ cents.  
 Antimony—Chinese and Japanese, nominal 15.00 to 15.50 cents.  
 Aluminum, nominal—  
 No. 1 Virgin 98-99 per cent., 36.00 to 38.00 cents.  
 Pure 98-99 per cent. remelt, 34.00 to 36.00 cents.  
 No. 12 alloy remelt, 26.00 to 28.00 cents.  
 Powdered aluminum, 75.00 to 85.00 cents.  
 Metallic magnesium—99 per cent. plus, \$2.00 to \$2.50.  
 Nickel—Shot and ingot, 50.00 cents.  
 Electrolytic, 55.00 cents.  
 Cadmium, nominal, \$1.45 to \$1.50.  
 Palladium, \$115.00.  
 Quicksilver (Nov. shipment from California), \$115.00.  
 Platinum—Pure, \$105.00.  
 10 per cent. Iridium, \$113.00.  
 Cobalt (metallic), \$2.70.  
 Tungsten—  
 Wolframite, \$23.00 to \$25.00.  
 Scheelite, \$26.00.  
 Gravel Fluorspar: f.o.b. mines—  
 Prompt, \$28.00 to \$30.00.  
 Contract, year 1918, \$25.00.  
 Silver (official), 85¾ cents.  
 \*Government price.  
 Metal Products.—Following quotations represent mill prices and are strictly nominal except in the case of lead sheets and sheet zinc:  
 Sheet copper—Base prices—  
 Hot rolled, 33.00 to 35.00 cents.  
 Cold rolled, 34.00 to 36.00 cents.

Copper bottoms, 41.00 to 43.00 cents.  
 (Shipments from stock 2c per pound extra.)  
 Copper rods—Base prices—  
 Round, 34.00 cents.  
 Square and rectangular, 35.00 cents.  
 Copper wire—Base prices—  
 nominal, 27.00 to 29.00 cents.  
 Brass products—Base prices—  
 High brass, sheets and wire, 28.75 to 30.75 cents.  
 Rods, 25.75 to 27.75 cents.  
 Low brass, sheet and wire, 31.25 to 33.25 cents.  
 Rods, 32.00 to 34.00 cents.  
 Brazed tubing—  
 Brass, 35.87½ to 37.87½.  
 Bronze, 41.25 to 43.25 cents.  
 Seamless tubing—Base prices—  
 Brass, 36.50 to 40.50 cents.  
 Copper, 39.50 to 42.50 cents.  
 Bronze 45.00 to 46.00 cents.  
 Full lead sheets, 9.25 cents.  
 Cut lead sheets, 9.50.  
 Sheet zinc, f.o.b., smelter, 19.00 cents.

## STANDARD EXCHANGE.

(Messrs. J. P. Bickell & Co., Standard Bank Bldg., report the following closing quotations on the Standard Stock & Mining Exchange at the close of business, December 7, 1917.)

### Gold.

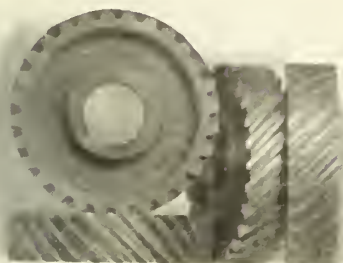
	Bld	Ask
Apex . . . . .	.05¾	.06
Boston Creek . . . . .	....	.28 ....
Dome Extension . . . . .	.09	.10
Dome Lake . . . . .	.13½	.14½
Dome Mines . . . . .	6.75	6.85
Imperial . . . . .	.01¾	.02
McIntyre . . . . .	1.37	1.38
Hollinger . . . . .	4.90	5.05
Newray . . . . .	.36	.38
Porcupine Crown . . . . .	.20	.25
Vipond . . . . .	.20	.21
Preston East Dome . . . . .	.02¼	.03½
Teck-Hughes . . . . .	.26	.29
West Dome . . . . .	.14¾	.15

### Silver.

	Bld	Ask
Adanac . . . . .	.12	.12½
Bailey . . . . .	.06	.06½
Beaver . . . . .	.29¼	.30
Chambers-Ferland . . . . .	.11	.12
Coniagas . . . . .	3.00	3.25
Crown Reserve . . . . .	.21	.23
Gifford . . . . .	.03¾	.04
Great Northern . . . . .	.04	.05
Hargraves . . . . .	.08¾	.09¼
Hudson Bay . . . . .	...	40.00
Kerr Lake . . . . .	4.85	5.15
La Rose . . . . .	.35	...
McKinley . . . . .	.56½	.60
Nipissing . . . . .	8.15	...
Peterson Lake . . . . .	.11¾	.13
Right of Way . . . . .	.04½	.05
Seneca Superior . . . . .	.01½	.02
Silver Leaf . . . . .	.01	.02
Temiskaming . . . . .	.27½	.28
Tretheway . . . . .	.12	...
Wettlaufer . . . . .	.04½	...
Provincial . . . . .	.45	.46

# CUT GEARS

For  
Mining  
Machinery



*Quick Delivery  
and Close Prices  
on Spiral Gears*

GET OUR QUOTATIONS



**Hamilton Gear & Machine Co.**

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## Smokestacks

48 in. x 111 ft. x $\frac{1}{8}$ "	.....\$700.00
42 in. x 70 ft. x $\frac{1}{8}$ "	..... 550.00
32 in. x 35 ft. x $\frac{1}{4}$ "	..... 350.00

Lots of Others—What do you Need?

## Air Receivers

2 6 ft. x 18 ft. x $\frac{1}{8}$ " plate	.....\$650.00 each
2 4 ft. x 15 ft. x $\frac{1}{8}$ " plate, all fittings	..... 600.00 each

We can ship you COMPRESSORS with above.

**WE GUARANTEE EVERYTHING WE SELL**  
to be in first class operating condition and exactly as specified.

We can ship you AT ONCE anything from a 70-ton locomotive to a keg of spikes. TRY US!

## Rails

3,500 feet 80-lb. at.....	.....\$60.00 per gross ton
75 tons 45-lb. at.....	..... 60.00 per gross ton
2 miles 30-lb. at.....	..... 60.00 per gross ton
2,500 feet 25-lb. at.....	..... 40.00 per gross ton
2,500 feet 16-lb. at.....	..... 40.00 per gross ton

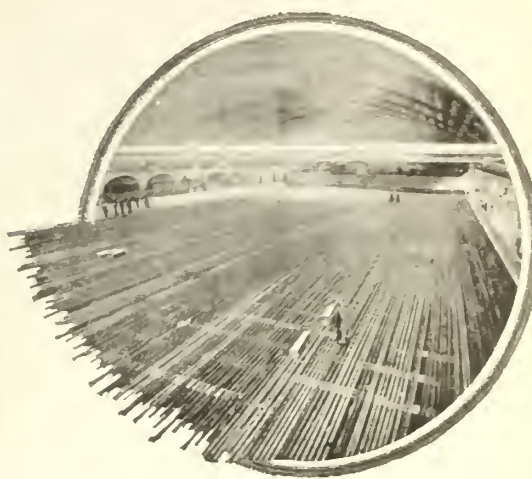
All good shape. With fish plates and bolts. We can equip a complete railroad from stock, including rails, ties, locomotives and cars. WE HAVE DONE IT.

**BURNS & ROBERTS**

Bank of Hamilton Building

TORONTO

## OxyAcetylene Welding and Cutting



## Two Thousand Joints in Ten Miles of Piping Made Leak-Proof at Less Cost

This illustration shows the groundwork of 2-inch ammonia pipe which forms the base of one of the largest artificial ice rinks in the world. The size of this immense rink is 210 ft. by 90 ft. Ten miles of piping was required, and every one of the 2000 joints was welded by the Prest-O-Lite Process at a substantial saving in cost over the old-style threaded joint. Moreover, the work was neater and smoother as well as stronger, because the welded joint is as strong as the pipe itself.

**Prest-O-Lite**  
PROCESS

has become standard practice on steel pipe lines in thousands of factories and plants. It is widely used in the construction of piping systems for steam, gas or air—in office buildings, hotels, factories, power plants, mines, machine shops and refrigerating installations.

The Prest-O-Lite Process employs both gases (acetylene and oxygen) in portable cylinders. Prest-O-Lite Dissolved Acetylene (ready to use) is backed by Prest-O-Lite Service, which insures prompt exchange of full cylinders for empty ones. Provides dry, purified gas, insuring better welds, quicker work and lower operating cost. Adaptable for oxy-acetylene cutting by the addition of a special cutting blow pipe.

Full instructions are furnished free to every user of Prest-O-Lite Dissolved Acetylene. Any average workman who understands metals can learn the process quickly and easily.

Write for valuable illustrated literature and data on work others are doing by this process, in construction, manufacturing and repairing. It may prove to be the solution of your problems.

Address Dept.

**The Prest-O-Lite Co., Inc.**

Canadian General Offices

Prest-O-Lite Building  
or, Elm St. and Centre Ave.

TORONTO

Direct Factory Branches, Canadian Plants.

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Toronto, Ont.  
Merriton, Ont.  
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Shawinigan Falls, Que.



**World's Largest Makers of Dissolved Acetylene**



## SILVER PRICES.

		New York. cents.	London pence.
November	21.....	85 $\frac{1}{4}$	43 $\frac{1}{4}$ <sup>0</sup>
"	23.....	84 $\frac{5}{8}$	42 $\frac{1}{8}$
"	26.....	84 $\frac{1}{4}$	42 $\frac{3}{4}$
"	27.....	84 $\frac{1}{4}$	42 $\frac{3}{4}$
"	28.....	84 $\frac{1}{4}$	42 $\frac{3}{4}$
"	30.....	84 $\frac{1}{4}$	42 $\frac{3}{4}$
December	1.....	85 $\frac{3}{8}$	42 $\frac{3}{4}$
"	3.....	84 $\frac{1}{4}$	42 $\frac{3}{4}$
"	4.....	85 $\frac{3}{8}$	42 $\frac{3}{4}$
"	5.....	85 $\frac{3}{8}$	42 $\frac{3}{4}$
"	6.....	85 $\frac{3}{8}$	42 $\frac{3}{4}$

Announcement has been made that the annual conference of mining men of the Northwest and representatives of affiliated industries, will be held in Spokane, Washington, during the week of February 11 to 17, inclusive. Preparations are already being made for the convention, which, in view of war conditions and other factors bearing on the mining industry, promises to be of unusual interest and importance. The mining conventions and exhibitions held periodically in Spokane are usually well attended by mining men from British Columbia, especially from Kootenay and Boundary districts, as well as by far larger numbers from various parts of the Northwestern States.

While Ainsworth and Slocan mines that have been shipping lead and zinc ores and concentrates to the Consolidated Co.'s smelting works at Trail have had their market closed for the time being, the Standard Silver-lead Mining Company, operating in the neighborhood of Silvertown, Slocan Lake, B.C., is in a better position, for it has a contract under which its zinc product is shipped to Bartlesville, Oklahoma. Things continue to go along much as usual at the Standard mine and mill, though lead ore can not be shipped to Trail at the present time.

At a meeting of the Yukon Council, held in Dawson several weeks ago, the Committee on Mining having reported favorably on the petition of Dr. Lachapelle and associates for aid in development of copper claims on Williams creek, a resolution was passed that the sum of \$1,500 be placed in the Supplementary Estimates for that purpose.

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PURPOSES

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WILLIAM R. PERRIN, Limited  
TORONTO

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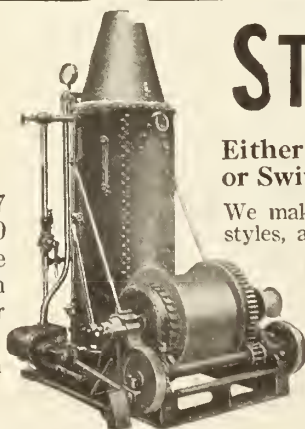
The safety and efficiency of compressed air haulage have been brought to the highest standard in Porter Locomotives. To these we have added an economy in cost and upkeep that no man interested in mine haulage can afford to disregard.

Write for full details to-day.

CANADIAN H. K. PORTER CO, 1218 UNION BLDG.  
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Made in 7 sizes, from 10 to 50 Horse Power, with one drum or two drums any diameter desired.



## STEEL CARS

Either End Dump or Side Dump, or Swivel, to dump either way.

We make these cars in a great variety of styles, and will send photos on application.

SPECIAL CARS made up to customer's design

Marsh & Henthorn,

Limited

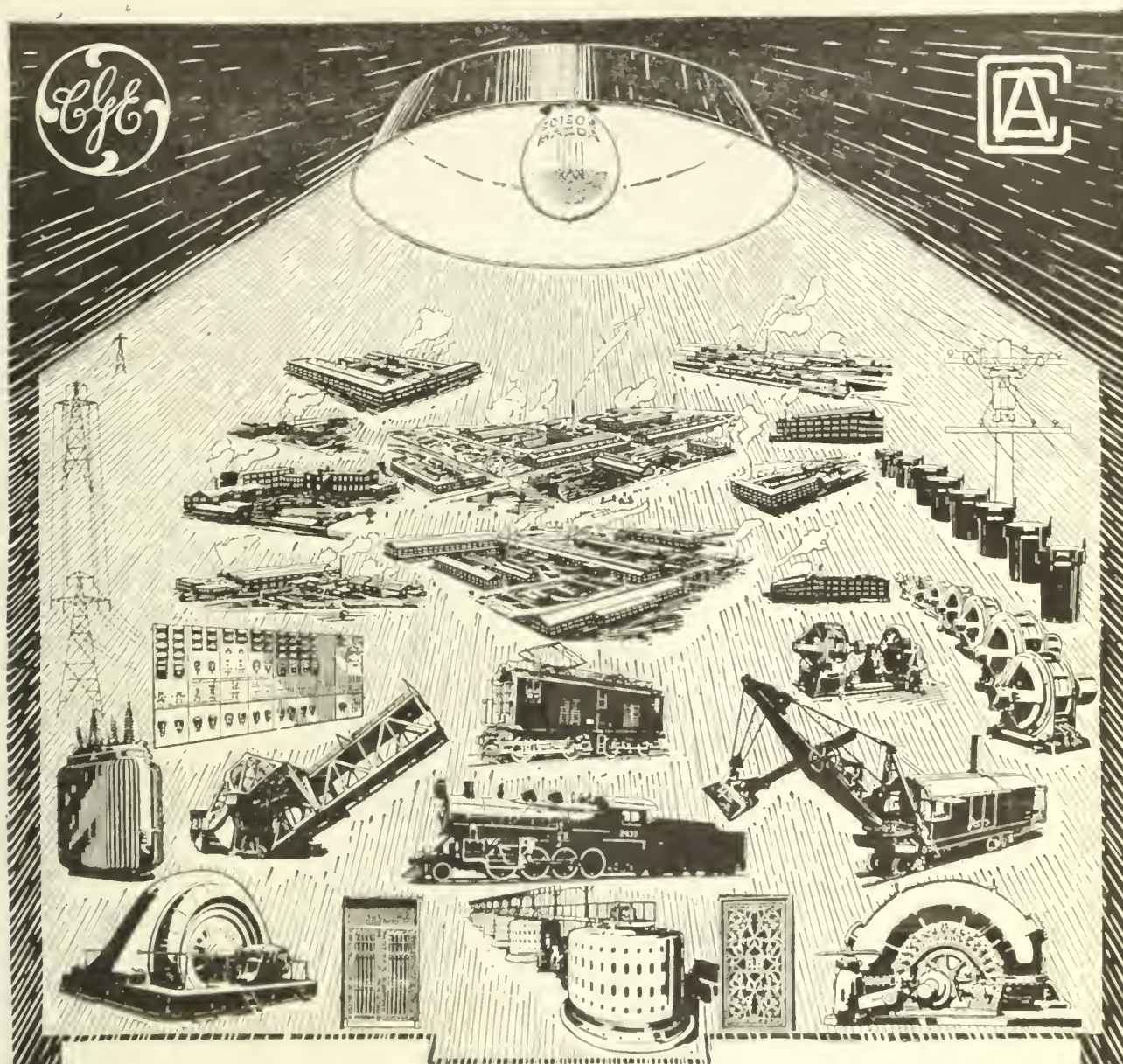
BELLEVILLE - ONT.

## Steel Buckets

Made any shape, size or style to suit customer.







## Quarter Century of Progress.

The Canadian General Electric Co., Limited, was organized in September, 1892—just a quarter of a century ago.

It had its origin in a syndicate of ten citizens of Toronto formed five years previously with a capital of \$10,000 to inquire into the feasibility of establishing, in Toronto, electric light and power by means of underground wires.

The Company has now a paid-up capital of \$10,000,000.00, a surplus of over \$1,000,000.00, and assets over \$25,000,000.00.

It owns 10 manufacturing establishments shown above, a large Head Office and 7 Branch Office buildings, and has 5,000 to 6,000 employees.

The Canadian General Electric Co., Limited, manufactures Electrical Ap-

paratus and Supplies for Railway, Light and Power purposes.

The Canadian Allis-Chalmers, Limited, a subsidiary company, manufactures Locomotives, Structural Steel, Cast-Iron Pipe and Power Plant Equipment, Mining, Crushing, Hydraulic and Milling Machinery.

By reason of its numerous factories and great manufacturing facilities, the company was able to take an early and leading part in the manufacture of Munitions of War, and recently obtained from the British Government an order for 1 Steel Steamships of 3,500 tons each.

This, briefly, is the record of a Quarter Century of Progress.

**CANADIAN GENERAL ELECTRIC CO. LIMITED**  
**CANADIAN ALLIS-CHALMERS LIMITED**



# GROCH CENTRIFUGAL FLOTATION, LIMITED

## FLOTATION PLANTS AND APPLIANCES

### "G.C.F." SYSTEM



Glass Fronted Model

By the Centrifugal System all the necessary aeration of the material under treatment is effected automatically through hollow shafts and centrifugal impellers obviating any necessity for compressors, blowers or similar appliances.

**SMALL CAPITAL OUTLAY. LOW COSTS.  
HIGH RECOVERIES. PRODUCTION OF  
A CLEAN CONCENTRATE.**

Each machine is in itself a complete flotation unit.

**ALL SIZES AND CAPACITIES.  
GLASS FRONTED SAMPLE-TESTING OUT-  
FIT.**

By means of this outfit every detail of the process of aerating, oiling, collecting and separating the valuable mineral from the ore being tested is in full view of the observer.

Suitable for samples of from 3 pounds to 10 pounds of crushed ore.

The flotation appliance is of cast iron with tubular shaft and centrifugal impeller 4 in. diameter. The driving mechanism is an electric motor operating a three-speed grooved pulley, the whole being mounted on a stand and furnished with a switch for attachment to any lighting circuit.

Shipping Weight 160 lbs.

Price of complete outfit ready to run \$200  
f.o.b. Cobalt, Ontario.

**FULL SIZE MACHINES** For large scale experimental work the two full-size impeller unit is so designed that it can be used in closed circuit for treating samples in 100 lb. lots and can be operated subsequently as a "grade-raiser" for the production of high-grade concentrates from the flotation "middlings" in a large scale plant.

The full-size flotation machine has six impellers which may be either 10 in. or 15 in. in diameter, depending on the output desired. The smaller impeller machine will handle from 50 to 75 tons and the larger one from 100 to 150 tons daily. Power consumption  $7\frac{1}{2}$  H. P. and 10 H. P. respectively.

These flotation machines are so constructed that they can be used in conjunction with any suitable crushing appliances that may be already installed on a mine or they can be equipped with ball mills, ball grinders, tube mills or other appliances designed for efficient flotation work.

Address all enquiries to

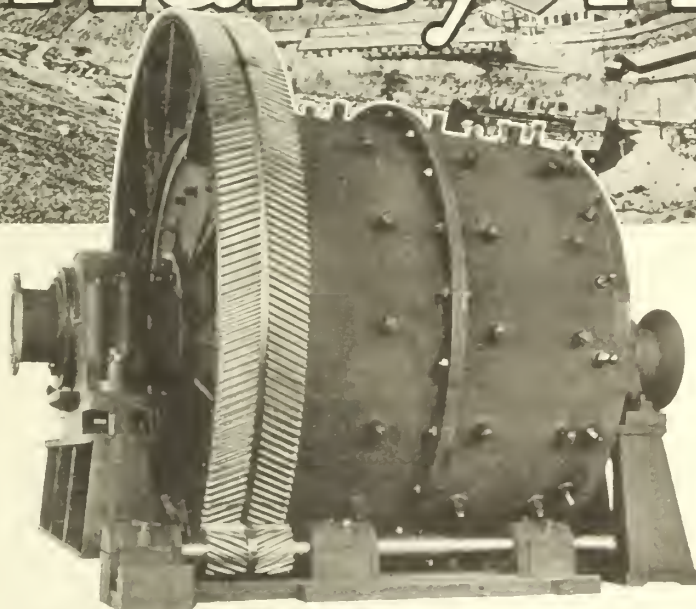
**GROCH CENTRIFUGAL FLOTATION, LTD.**

Box. No. 160, Cobalt, Ontario.



"G.C.F." Full Size Machine





## First ONE—Then TWO—Then FIFTEEN—at THE BRADEN COPPER COMPANY

At this mammoth plant efficiency must be at par. The only basis upon which costs are computed is that of the per ton unit. Things are done only after careful experimentation has proved them right. In June, 1915, the Braden Copper Company purchased one No. 86 Marcy Ball Mill. In January, 1916, two more. In July, fifteen more.

Here, as in every other case where the Marcy has been tested, it has made good. The reason is easy to find.

The Marcy is a millman's mill. It takes into consideration every condition that its designers have learned through long practical experience.

It takes a coarse feed direct from the crushers and, in **One Easy Step**, delivers a product of the required degree of fineness for treatment.

The Marcy is sufficiently strong to meet any condition. The entire discharge head is fitted with grizzlies of welded chrome steel. The grates fit the head perfectly.

This construction gives a greater discharge area than in any similar device on the market. There is no unnecessary regrinding with a Marcy.

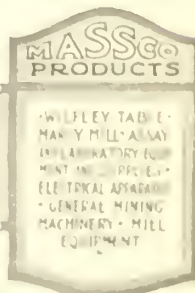
Capacities are from 25 to 1000 tons per 24 hours; one man can operate an entire battery of mills; minimum floor space is required; power consumption is at bedrock.

In every instance where the Marcy Ball Mill has been tested with other mills on a basis of cost per ton the Marcy has shown its superiority.

## MARCY MILL

CRUSHING  
"ONE  
EASY  
STEP"

¶ The Marcy is YOUR mill. Why? is explained in "ONE EASY STEP," a pamphlet—sent if you will write.



### THE MINE AND SMELTER SUPPLY COMPANY

A SERVICE STATION WITHIN REACH OF YOU

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SALT LAKE CITY

EL PASO

NEW YORK OFFICE - 42 BROADWAY



# Ontario's Mining Lands

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Ontario, with its 407,262 square miles of area, contains many millions of acres in which the geological formations are favourable for the occurrence of minerals, 70 per cent. of the rocks being of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Helen, Magpie and Moose Mountain mines.

Many other useful minerals, both metallic and non-metallic, are found in Ontario—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluorspar, graphite, gypsum, iron pyrites, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt and tale.

Building materials, such as marble, limestone, sandstone, granite, trap, sand and gravel, meet every demand. Lime, Portland cement, brick and tile are manufactured in quantity within the Province.

Ontario in 1916 produced 45 per cent. of the total mineral output of Canada. Returns made to the Ontario Bureau of Mines show the output of the mines and metallurgical works of the Province for the year 1916 to be worth \$65,303,822, of which the metallic production was \$55,002,918.

The prospector can go almost anywhere in the mineral regions in his canoe; the climate is invigorating and healthy, and there is plenty of wood and good water. A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 240 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in surveyed or unsurveyed territory.

For list of publications, illustrated reports, geological maps and mining laws, apply to

**HON. G. H. FERGUSON,**

Minister of Lands, Forests and Mines.

**Toronto, Canada**

# HOMESTEADS

## IN THE BANNER HOME PROVINCE OF ONTARIO

**20,000,000 ACRES of the Finest Agricultural Land in Canada  
Waiting for You in the Northern Part of Ontario.**

Think of it! Homesteads available at 50 cents per acre—close to railroads—close to markets—close to civilization and attending advantages.

Land of opportunity—you can make yourself a home within a short day's journey of Toronto.

Land lies in one of the best belts of Canada, along the TEMISKAMING AND NORTHERN ONTARIO RAILWAY, which has connections with the G. T. R., C. P. R., C. N. R., and C. G. Rys. thus bringing the settlers within easy reach of the profitable markets of the continent and Europe.

Prosperous towns, growing into cities; in this way local markets available to the settler for buying and selling.

You may have a happy home and a fertile farm at 50 cents per acre in your own home province of Ontario—why, then, go far afield for these ideal conditions?

Exhibits of the products and of the possibilities of production of New Ontario's land have been shown at Canada's National and other Expositions, so that it is now known as Canada's land of production.

Not only land of agriculture, but embraces large and rich mineral belts from which annually millions of dollars of gold and silver are mined.

*Learn More of This Land of Plenty by Sending for Free Booklet to George W. Lee, Commissioner and General Agent, North Bay, Ont.*

## TEMISKAMING & NORTHERN ONTARIO RAILWAY COMMISSION

Executive Offices: 56 Church Street, TORONTO, Ont.

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### BALL MILLS

2-5 ft. x 10 ft., Bonnot & Co.

### CRUSHERS

1 No. 5 Champion Jaw Type 11 x 26.  
1 Buchanan Jaw Type 9 x 15.  
1 Farrell Jaw Type 9 x 15.  
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1 Austin Gyratory Type No. 7½  
1 Gates Gyratory Type No. 1  
1 Gates Gyratory Type No. 3.  
1 Gates Gyratory Type No. 2.

### CRUSHING ROLLS

1 Sturtevant 15 x 26.

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2 Strond No. 3.

### PULVERIZERS

2 Jeffrey 30 x 36.

### TUBE MILLS

15 x 22 Silex Lined.

We have a large stock of Air Compressors, Boilers, Cars, Drills, Drill Steel, Hoists, Piping, Pumps, Rails, etc. Send us your enquiries.

USED MACHINERY PURCHASED

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COBALT, ONT., AND 42 B'WAY, NEW YORK

PURCHASERS OF GOLD & SILVER ORES

## SUCCESSFUL FLOTATION OILS

SPECIAL COAL TAR LIGHT OILS (containing high  
percentage of Phenols)

Shipments of Drums or Tankcars

DOMINION TAR AND	CHEMICAL COMPANY
<u>TAR DISTILLERIES :</u>	Sault St. Marie, Ont.
	Sydney, Nova Scotia

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# CANADA

## DEPARTMENT OF MINES

HON. ARTHUR MEIGHEN, Minister.

R. G. McCONNELL, Deputy Minister.

### MINES BRANCH

#### Recent Publications

The Nickel Industry: with special reference to the Sudbury region, Ont. Report on, by Professor A. P. Coleman, Ph.D.

The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.

Building and Ornamental Stones of Canada (Western Provinces). Vol IV., by W. A. Parks, Ph.D.

Feldspar in Canada. Report on, by H. S. de Schmid, M.E.

Peat, Lignite and Coal: their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.

Annual Report of Mineral Production during Calendar Year, 1915, by John McLeish, B.A.

The Petroleum and Natural Gas Resources of Canada: Vols. I. and II., by F. G. Clapp, M.A., and others.

The Value of Peat Fuel for the Generation of Steam. Bulletin No. 17, by John Blizard, B.Sc.

Cobalt Alloys with Non-corrosive Properties. Report on, by H. T. Kalmus, B.Sc., Ph.D.

Electro-thermic Smelting of Iron Ores in Sweden. Report on, by A. Stansfield, D.Sc.

Non-metallic Minerals Used in Canadian Manufacturing Industries. Report on, by H. Frechette, M.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

**Fuel Testing Laboratory.**—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.

**Ore-Dressing Laboratory.**—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.

**Chemical Laboratory.**—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.

**Ceramic Laboratory.**—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.

**Structural Materials Laboratory.**—Experimental work on sands, cements and limes is also undertaken.

Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to **The Director, Mines Branch, Department of Mines, Ottawa.**

### GEOLOGICAL SURVEY

#### Recent Publications

Memoir 85. Road Material Surveys in 1914, by L. Reinecke.

Memoir 87. Geology of a Portion of the Flathead Coal Area, British Columbia, by J. D. Mackenzie.

Memoir 92. Part of the District of Lake St. John, Quebec, by John A. Dresser.

Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.

Memoir 94. Ymir Mining Camp, British Columbia, by Charles Wales Drysdale.

Memoir 95. Onaping Map-Area, by W. H. Collins.

Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.

Memoir 97. Scroggie, Barker, Thistle and Kirkman Creeks, Yukon Territory, by D. D. Cairnes.

Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.

Map 57A. Frank, Alberta (showing the landslide of 1903).

Map 63A. Moncton Sheet, Westmorland and Albert Counties, New Brunswick. Topography.

Map 151A. Nansen and Victoria Creeks, Nisling River, Yukon Territory.

Map 152A. Kluane Lake, Yukon Territory.

Map 154A. Southwestern Yukon.

Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.

Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.

Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.

Map 166A. Portion of Flathead Coal Area, Kootenay District, B.C. Topography.

Map 182A. Portion of Flathead Coal Area. Geology.

Map 186A. Explored Routes between Lake Athabaska and Great Slave Lake on the Tazin, Taltson, Slave and Peace Rivers.

Map 1667. Slocan Mining Area, Kootenay District, B.C.

Map 1677. Coleraine Sheet, Megantic and Wolfe Counties, Quebec.

Applicants for publications not listed above should mention the precise area concerning which information is desired.

Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to **The Director, Geological Survey, Ottawa.**

## To Users of the Callow Pneumatic Flotation Cell

**U**SERS of the Callow Cell are naturally interested in knowing how the decision of the United States Circuit Court of Appeals for the Third District, in the Miami case, will affect their interests.

As we understand the prevailing opinion of Judge Woolley in the Miami case he has interpreted the Supreme Court decision in the Hyde case as meaning that "*invention resides not alone in the critical proportion of oil, but also in air and agitation,*" and again, "*in the co-action of the critical proportion of oil and air effected by 'an agitation greater than, and different from that which had been resorted to before,' resulting in a froth concentrate of economical value,*" and further, that the Supreme Court did not limit the patent to "*agitation by mechanical means,*" but to agitation of a violent and persistent kind; "*it mixes the oil with the metal of the ore. This is old. Then, by its greater intensity and longer duration, it stirs the pulp into a froth.*"

Thus, this decision of the Third Circuit Court of Appeals has a most important bearing upon the art, because it holds that the mixing of the oil with the mineral is old, but it **leaves open the use of oil in connection with aeration-cells.**

Meanwhile the idea of a "critical" proportion of oil has been dis-

proved by practice in several mills within a short time after it was promulgated.

Judge Woolley says further, concerning the Callow Cell: "*Aeration is direct, and is not the result of or caused by agitation. On the contrary, agitation results from aeration and such agitation, though present in some measure, is not even approximately of the violence and duration of the agitation of the patent. The operation in the Callow Cell certainly possesses these distinguishing features from operation of the process where aeration is caused by agitation.*"

The Court further confirms this important dictum by saying: "*If the only agitation to which the pulp was subjected (after such agitation as in the prior art was necessary to mix the oil and ore) was the agitation of the Callow Cells, we would not say that that agitation amounted to or was the equivalent of the violent agitation of the patent disclosure and constituted infringement.*"

Apparently users of the Callow Cell may feel assured they do not infringe the method of agitation described in U.S. Patent No. 835,120 (less than 1% oil), No. 962,678 (soluble frothing agents), No. 1,099,699 (phenol or cresol in the cold without acid) since all three of the patents are of the same process, dependent upon a certain degree of violence and length of agitation and the production of the same characteristic froth, as set forth in their claims

(Signed) J. M. Callow.





*The Babbitt Metal that's at the  
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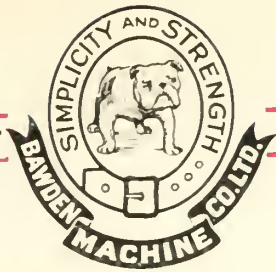
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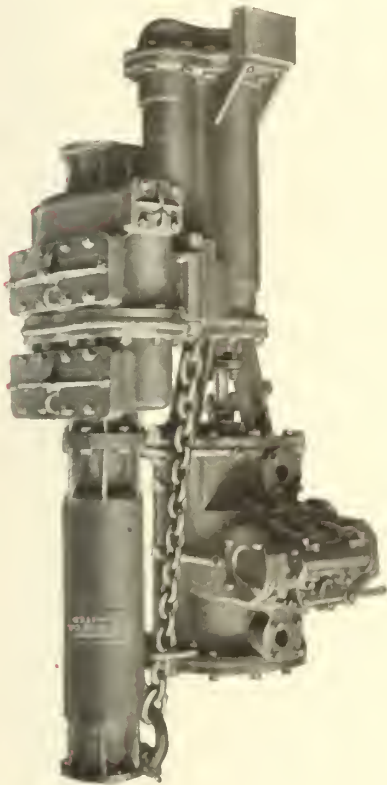
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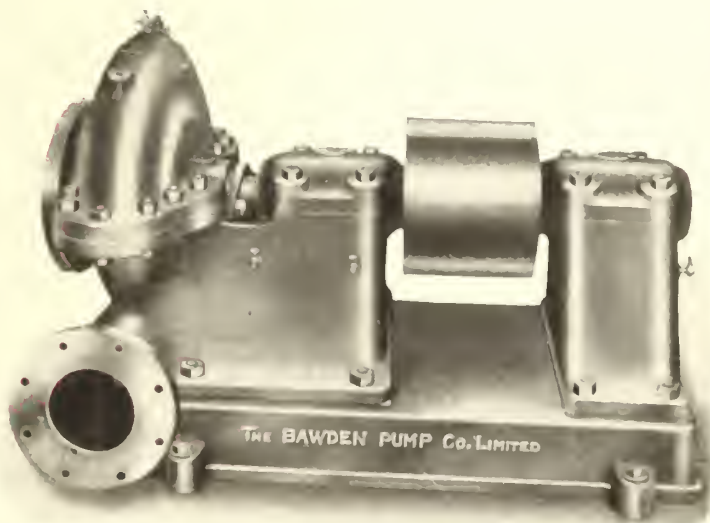
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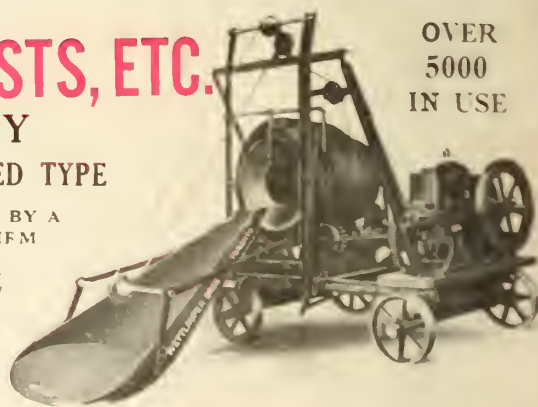
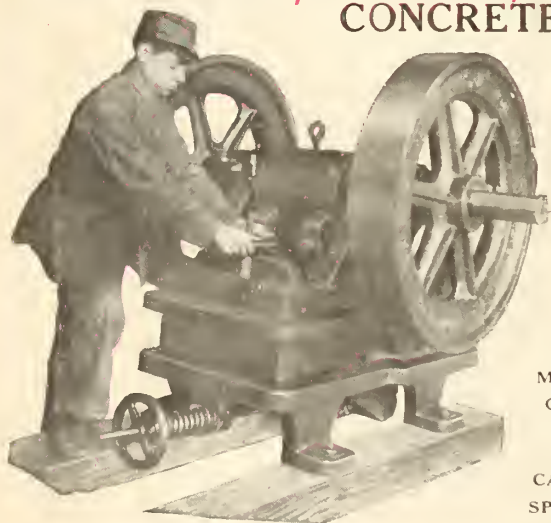
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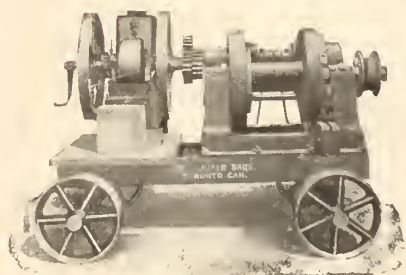
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